

ROOTS

BOTANIC GARDENS
CONSERVATION
INTERNATIONAL
EDUCATIONAL REVIEW

VOLUME 20, NUMBER 2
OCTOBER 2023

CONNECTING VISITORS WITH NATURE



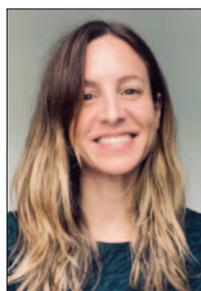
**BOTANIC
GARDENS**
CONSERVATION
INTERNATIONAL

Editors:



Helen Miller

Head of Education and Vocational Training



Ane Zabaleta

Education and Training Officer

Design: John Morgan www.seascapedesign.co.uk
Cover image: Pond dipping at Cape Fear Botanical Garden (Cape Fear Botanical Garden)

Roots is published by **Botanic Gardens Conservation International (BGCI)**. It is published twice a year. Membership is open to all interested individuals, institutions and organisations that support the aims of BGCI.

Further details available from:

- Botanic Gardens Conservation International, Descanso House, 199 Kew Road, Richmond, Surrey TW9 3BW UK.
Tel: +44 020 8175 5105,
E-mail: info@bgci.org, www.bgci.org
- BGCI (US) Inc, The Huntington Library, Art Collections and Botanical Gardens, 1151 Oxford Rd, San Marino, CA 91108, USA.
Tel: +1 626-405-2100, E-mail: usa@bgci.org
Internet: www.bgci.org/usa
- BGCI (China), C/O South China Botanical Garden, CAS, 723 Xingke Rd. Guangzhou, 510650, Guangdong, China
Tel: (86)20-85231992,
Email: xiangying.wen@bgci.org
www.bgci.org/china/
- BGCI (Southeast Asia), Greetha Arumugam BGCI Southeast Asia Botanic Gardens (SEABG)
Network Manager
BGCI Southeast Asia Office
Email: greetha.arumugam@bgci.org
- BGCI (Africa), Kirsty Shaw, BGCI Africa Office, IUCN Eastern and Southern Africa Regional Office (ESARO), P.O. Box 68200 - 00200, Nairobi, Kenya.
Tel. +254 (0)725295632 Skype: [bgci_kirsty](https://www.skype.com/user/bgci_kirsty),
Email: kirsty.shaw@bgci.org,
Internet: www.bgci.org

BGCI is a worldwide membership organisation established in 1987. Its mission is to mobilise botanic gardens and engage partners in securing plant diversity for the well-being of people and the planet. BGCI is an independent organisation registered in the United Kingdom as a charity (Charity Reg No 1098834) and a company limited by guarantee, No 4673175. BGCI is a tax-exempt 501(c)(3) non-profit organisation in the USA and is a registered non-profit organisation in Russia.

Opinions expressed in this publication do not necessarily reflect the views of the Boards or staff of BGCI or of its members.

FIRST WORD

03

Connecting visitors with nature

Helen Miller

ARTICLES

05

The language of connection: Raising the bar for science communications

Rebecca Hansell

08

Westonbirt's mission: Connecting people with trees to improve lives

Helen Chick

12

Promoting the connection with nature through ethno-knowledge and cultural activities

Guaraci M. Diniz Jr. & Luiz H. R. Baqueiro

16

Nurturing nature's wisdom: JNTBGRI Garden's bridge for forest officials

M. Abdul Jabbar, Anurag Dhyani & Mathew Dan

20

Making conservation personal with threatened Cape lowland habitat displays

Annerie Senekal

23

A perfect match – artists in the botanic garden

Izabela Kuzyszyn, Anna Albin, Marianna Darżynkiewicz-Wojcieszka & Marcin Zych



28

A video-based analysis of school workshops at Neuchâtel's Botanic Garden

Laure Kloetzer, Léa Wobmann, Marion Picard and Blaise Mulhauser

32

With nature therapies the Bogota's Botanic Garden leads the way in reconnecting with our natural world

Martha Liliana Perdomo R. & Paola Liliana Rodríguez S.

35

The Andromeda Ethnobotanical Garden

Sharon Cooke

38

Returning education to nature - taking the "Little Botanist" series of courses as an example

Fengying Wang

41

Individualize nature engagement to each life stage of audience members

Don Rakow & Christopher Hoffman

REGULARS

44

Resources

FIRST WORD

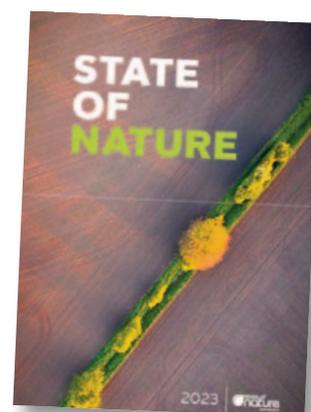
CONNECTING VISITORS WITH NATURE

Helen Miller
Head of
Education and
Vocational Training
BGCI



This issue of Roots is dedicated to the role that botanic gardens play in connecting their visitors with nature. As I write this editorial, and review some of the stories that have been in the news here in the UK in the last week I am struck by how important this topic is right now. The latest State of Nature report which provides a benchmark for UK biodiversity has just been published and it makes for depressing reading. It states that there is no let up in the decline of our wildlife, highlighting that like most other countries worldwide, the UK has seen significant loss of its plants, animals and fungi. From a flora perspective, since 1970, more than half of our flowering plants, mosses and their relatives have been lost from areas where they used to thrive.

Also in the news this week is the story of a 200 year old sycamore tree made famous in the early 1990s film Robin Hood Prince of Thieves, that had grown in a gap in the historical Hadrian's wall (a world heritage site that stood as the north-west frontier of the Roman empire for nearly 300 years). The illegal cutting down of the tree has led to an outpouring of grief that symbolises our connection with nature and the important role that it plays in our memories, our emotions and our everyday lives.



Above: State of Nature report 2023
Below: Sycamore gap (Tomorrow never knows/Creative Commons)



Botanic gardens have a crucial role to play in addressing the issues raised in both of these news stories. The decline in our biodiversity is primarily linked to the challenge of climate change, habitat degradation and land use change. All issues that seem overwhelming and for governments to address, but the reality is that we can all play our part in conserving local wildlife, making individual changes that collectively lead to positive change and using our voices to push leaders into action. The starting point for all of those levers is a love of and connection to nature, and that is exactly where botanic gardens come in.

Through our programmes, events and activities we have an opportunity to inspire our visitors and other audiences that we work with to appreciate and take action for nature. But how do we go about building that connection? In the start of a regular feature BGCI's own Communication's Officer (Rebecca Hansell) writes about the language of connection and the role that science communication has to play in this important topic (page 5). At Araribá JB in Brazil and The Andromeda Botanic Gardens in Barbados, the use of ethno-botanic knowledge is being used to connect visitors with nature, read more on pages 12 and 35 respectively. At Stellenbosch University Botanical Gardens in South Africa, we hear about the work they have been doing to make conservation personal through the development of a threatened Cape lowland habitat display (page 20). And at Jawaharlal Nehru Tropical Botanic Garden and Research Institute in India the garden has developed a training programme for forest officials to build capacity and recruit environmental stewards to safeguard local biodiversity (page 16).

At Neuchâtel Botanic Garden in Switzerland, we hear about a video-based analysis of school workshops and what this can tell us about the best way to engage school groups with nature (page 28), and at Shanghai Chenshan Botanical Garden in China, you can read about their Little Botanist series of courses which have been designed to guide teenagers to approach nature (page 38).

As well as the conservation impact of connecting with nature, this issue also looks at the important role that spending time outside in nature can have on both our physical and mental health. Botanic gardens as enclosed spaces with biodiverse collections and expertise, can provide a haven of refuge and contemplation and many gardens now provide a range of activities and events in the mental health and well-being space from yoga, forest bathing, mental health walks and even working with local medical services to offer social prescribing opportunities. In this issue, Westonbirt Arboretum (UK) tell us about the work they have been doing to connect people with trees to improve lives (page 8). At the University of Warsaw Botanic Garden (Poland) we hear about a programme that the garden has developed with local artists, to inspire botanic based art exhibits that are displayed in the gardens for visitors to interact with (page 23). At Bogota Botanic Garden (Colombia), they have been running a nature therapy programme to help visitors reconnect with our natural world (read more on page 32).

Finally on page 41, colleagues from Cornell University and Cape Fear Botanical Garden provide a great summary of the work that a range of botanic gardens have been doing to connect visitors with nature.

As always we hope you enjoy this issue and that it sparks you and your garden to consider the way in which you engage your visitors to connect with nature and take inspiration from some of our articles.

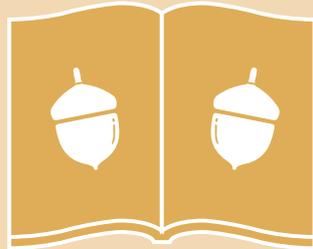
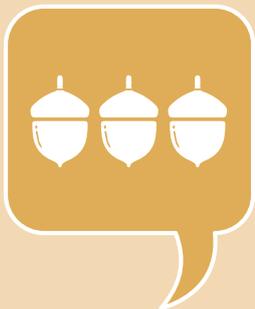


Westonbirt Arboretum, Acer Glade
(Johnny Hathaway)



Yoga on the lawn Longhouse Reserve
(Longhouse Reserve)

THE LANGUAGE OF CONNECTION: RAISING THE BAR FOR SCIENCE COMMUNICATIONS



The language we use and how we approach the audiences of botanical institutions is a vital tool to engage the public in large-scale, often scary, environmental issues that frequently make headlines. How can we use language to the fullest, in the name of influencing behavioural change, to aid conservation?

An acorn drops to the forest floor, is buried, and eventually germinates. It grows amongst the other species that create the forest ecosystem, growing ever taller until the tips of its branches finally reach the point where they feel the warmth of the sun beating down upon them. This is the natural way of things; it has been happening for millions of years but increasingly there is disruption to the course of nature. Our ancestors would wander freely amongst the diversity of the Earth without having to face the often-overwhelming realisations that plague the minds of modern generations. The planet is in trouble, which is not even news anymore, but our society has become numb and alienated from the facts as a form of misguided self-preservation – if I don't acknowledge the issue, then maybe it's not real.

To counteract this, we need to actively pursue ways to connect visitors with the realities of nature, so they feel like part of the natural world, and not separate from it. The language we use can make or break the level of understanding of environmental issues. Large scale, often scary, topics such as biodiversity loss and climate change can overwhelm audiences and encourage indecision as to what path to take, which hinders behaviour change and progress. As organisations that are public facing, botanic gardens have the potential to significantly influence behaviour change in visitors, but only if they engage in effective science communications which connect with a variety of audiences (University of Minnesota, 2016). To do this we need to raise the bar of what, and how, we communicate as a conservation community.

This can be achieved by something that I call the **RAISE** approach. It is simple - science communications surrounding environmental issues should, at their heart, be:

- Realistic
- Accessible
- Inclusive
- Solution-based
- Educational



The language we use when conveying complex matters to the public is paramount to ensure a positive, united outcome which is clearly understood by the masses.

- Realistic
- Accessible
- Inclusive
- Solution-based
- Educational

We need to raise the bar of what, and how, we communicate as a conservation community.

Let us look at how these can be used effectively.

Being realistic, or telling inconvenient truths, is not an easy task. When faced with a barrage of negative or concerning information, audiences can easily get overwhelmed and disengage with the issue. Yet, being realistic and not sugar-coating the truth is vital for effective communication. We need to counteract the impact of the constant bombardment of fearmongering headlines, and fake news, that can cloud the judgement of those who want to do better by the environment. As scientific institutions, botanic gardens and arboretums should be using their platforms to provide realistic information on the issues that impact our audiences.

When providing this information, we should also consider the accessibility of our content to ensure that messaging is as widespread as possible. When considering accessibility, it is vital to consider the different demographics we could reach including; the non-scientific community (using plain language), those with visible/invisible disabilities (using sensory tools/physical adaptations), or the use of multimedia options to accommodate those with visual or auditory impairments. Being actively aware of the challenges your audiences face can be the difference between successful or forgettable communications.

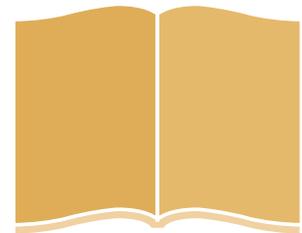
This also helps us to be inclusive and to ensure that communications are meeting the needs of different communities. It is important that we make a conscious effort to include various ages, languages, and backgrounds, whilst acknowledging the varying priorities of potential visitors, that may not have been historically considered (Eve & Wilson, 2022).

Research shows individuals tend to respond more positively to environmental issues when they are offered solutions. Overwhelm is a widespread problem to overcome when communicating environmental concerns, but solutions can be the antidote. When given solutions, which actively impact the issues discussed, audiences are more likely to engage, fully understand, and make lifestyle and opinion changes (Shashkevich, 2019). As a rule, the public are more likely to act on issues that directly impact them, and they feel they have control over. Giving information that can be used for the protection of the natural world, and relates to the lives of our audiences, is paramount to influencing behavioural change and environmental understanding. Solutions can also come in the form of having a safe space to air concerns and anxieties surrounding environmental issues. Eco-anxiety is a very real issue in modern times, and being listened to and having concerns acknowledged can be a vital first step towards embracing solutions.

Formal education ends, for most, when they leave school or university during early adulthood. However, education and learning can (and arguably should) be a lifelong endeavour. A problem can only be solved when it is fully understood and, as scientific institutions which can be accessed by the public, botanic gardens have a duty to address adult education needs. This includes overall scientific literacy, encouraging the understanding of local/global issues, and both instigating and supporting conservation conversations (Kueffer & Larson, 2014).

Throughout the recent pandemic, many of us rediscovered a connection with nature, whether that be on daily walks, visiting botanical institutions, or bringing more of nature into our homes. Now, post-COVID, we can use this momentum to strengthen our audience's connection with nature. We now live in a world that demands clear information regarding its own health and wellbeing, the impact of issues on daily lives, and ways to sustain livelihoods and safety. COVID-19 taught us that the language we use when conveying complex matters to the public is paramount to ensure a positive, united outcome, which is understood by the masses. Use of inaccessible analogies, jargon, or overwhelming data can lead to misunderstanding and distrust (Rodrigues, 2023). By maintaining and nurturing the connection of our visitors with nature, that helped us all through a difficult few years, we can reduce the likelihood of misunderstandings regarding environmental issues.

Language plays a key role in how the public see the world around them and, therefore, how they behave.



The environmental battle is going to be hard; the solutions are complex; but audiences don't want to be told the obvious.

The aim should be to empower audiences by using a variety of communication platforms. Common types of communications that all botanical institutions should consider when undertaking the RAISE approach, include:

- Social media
- Press networks
- In-person tours/talks/events
- Online (multimedia) tours/talks/events
- Accessible websites
- Engaging interpretation
- Workshops/training

Communications need to be multi-faceted to reach the maximum number. It doesn't have to be complicated - communications surrounding environmental issues need to be:

Realistic
Accessible
Inclusive
Solution-based
Educational

Language is the tool we use to wield the full power of effective communication. Language plays a key role in how the public see the world around them and, therefore, how they behave. It is important to be aware of the language we use in communications. Language that adheres to the **RAISE** approach is likely to empower and engage audiences, whereas, at its worst, language can alienate and cause detrimental impacts that are opposite to the desired outcome (Clawson, 2008). The way that language is used can significantly impact both the short- and long-term environmental goals of your institution and beyond.

Negative words and attitudes lead to a triggering of our flight or fight response, we lose control of the situation and are at the will of our more primal reactions. The environmental battle is going to be hard; the solutions are complex; but audiences don't want to be told the obvious. The public want to be seen, they want to be involved in the solution, they don't want to be told that they are part of the problem. They want hope (Benston, 2019). They want to be included in the conversations and decisions that impact their lives. Empowering language changes the way we feel about the issues that must be tackled, and from emotion grows action – that is what we need to aim for when reaching the audiences that visit our institutions.

An acorn drops to the forest floor, is buried, and eventually germinates. It grows amongst the other species that create the forest ecosystem.

It takes a village.

We need to work together.

The forest is not made of only that single mighty oak, grown from the acorn. It takes various species of trees, plants, fungi, and animals, connected through varying climates, time, and space to make a functioning ecosystem. Similarly, it takes a vast network of empowered individuals to create something much bigger, more significant, and more beautiful, than the sum of its parts.



REFERENCE

Benston, J. 2019. Our words can empower us...or disempower us. [Online] Available at: [Our Words Can Empower Us ... Or ... Disempower Us - Jane Benston](#) [Accessed 09/08/2023]

Clawson, J. 2008. Empowering Language. [Online] Available at: [Empowering Language by James G. Clawson :: SSRN](#) [Accessed 09/08/2023]

Eve, K & Wilson, K. 2022. Using language to empower: How authors can use language to promote the safety and status of all people. [Online] Available at: [Using language to empower \(elsevier.com\)](#) [Accessed 09/08/2023]

Kueffer, C & Larson, B. 2014. Responsible Use of Language in Scientific Writing & Science Communication. [Online] Available at: [Responsible Use of Language in Scientific Writing and Science Communication | BioScience | Oxford Academic \(oup.com\)](#) [Accessed 09/08/2023]

Rodrigues, P. 2023. Plain language in science communication: from the lab to the world. [Online] Available at: [Plain language in science communication: from the lab to the world | Patrícia Rodrigues - Medical Writing & Comunicação em Saúde \(healthwords.pt\)](#) [Accessed 09/08/2023]

Shashkevich, A. 2019 'The power of language: How words shape people, culture.' [Online] Available at: [The power of language: How words shape people, culture \(stanford.edu\)](#) [Accessed 09/08/2023]

University of Minnesota, 2016. Communication in the real world – 3.2 Functions of Language. [Online] Available at: [3.2 Functions of Language – Communication in the Real World \(umn.edu\)](#) [Accessed 09/08/2023]

AUTHOR

Rebecca Hansell
Communications Officer
Botanic Gardens Conservation
International
rebecca.hansell@bgci.org

WESTONBIRT'S MISSION: CONNECTING PEOPLE WITH TREES TO IMPROVE LIVES

Westonbirt, The National Arboretum has a mission: to connect people with trees to improve the quality of life. Westonbirt runs a range of access and inclusion initiatives, such as focused marketing campaigns, community group access schemes, launching books, delivering an established education programme and providing interpretive experiences and tailored volunteering opportunities. These are just a few of the projects that are finding new ways to connect local and international visitors of all ages with nature.

Westonbirt, The National Arboretum is a busy place, welcoming approximately 600,000 visitors a year and is home to over 15,000 individual trees representing 2,500 taxa.

This stunning location, with its unique collection of trees from around the temperate world, promises an experience of nature at its finest. The visitors, and the thousands who follow Westonbirt online each month, provide Westonbirt's staff and volunteers the opportunity to communicate the significance of trees and nature every day, and in many ways.

"So much about what we do to engage people with Westonbirt Arboretum is all about the fundamental connection humans share with nature." Nia Crouch, Engagement Manager, Westonbirt

Are you taking the time to experience nature from a new perspective?



Above: Little Book of Disappearing Trees, second edition (Emily Burgin)
Top: Learning activity at Westonbirt (Johnny Hathaway)



A research project by Exeter University; 'Restoring the landscape for social inclusion', involved multiple strands exploring how to reframe and alter accessibility in nature to be a welcoming space for all. Westonbirt was involved with two strands, one of which was working with established disabled artists to create an exhibition exploring nature through their perspective. The team at Westonbirt went on to develop Sensing Nature walks, recruiting and training visually impaired volunteers to become Guides, who lead the public on gentle walks, inviting them to take a multi-sensory exploration through nature using touch, smell and sound. The walks are now embedded in the annual programme of guided walks.

Katie Jarvis (Cotswold Life) joined one of the walks this year, and said:

"Almost without my telling them so, my brain cells move from their obsessive sight-based sensing to something more subtle. Yes, they [walk guides] tell me, casually - as though I'm the one fixated on the visual - the ground you are on is soft and grassy; flat and safe."

Approximately 100 species contained within Westonbirt's collection are classified as threatened with extinction. In 2017 Westonbirt produced 'The Little Book of Disappearing Trees', detailing several threatened trees within the collection and the role Westonbirt plays as a living resource for research, conservation, learning and international public engagement. The book also refers to partnership work that is being carried out both nationally and internationally to understand, research and care for threatened tree species.

Interacting with the book's content, readers' feedback included:

"How many species are so close to being extinct - I'm shocked! We are so glad we can enjoy them here at the arboretum!"

Westonbirt Arboretum, Acer Glade
(Johnny Hathaway)

"So much about what we do to engage people with Westonbirt Arboretum is all about the fundamental connection humans share with nature."

Nia Crouch, Engagement Manager, Westonbirt



Sensing Nature walk, guides
(Alison Whaley)

“How close we are to losing some trees - because animals' extinction is more noticeable/discussed”

“The impact of the human race on trees - more of this type of book will change culture”.

In light of increased and updated information on the extinction risk of many species grown at Westonbirt, made available via the output of the BGCI-led Global Tree Assessment, the book was updated for 2022, with this latest version also available online through Forestry England's website.

An activity providing another opportunity to engage the public was the discovery in 2015 of Chalara ash dieback within the woodlands of Silk Wood. In 2021 major silvicultural work took place to remove infected ash trees. The removal of the trees gave the team the chance to explain and promote why the trees were being removed; how Forestry England are safeguarding trees from pests and diseases. Local TV BBC Points West were invited to help share the story with their viewers, adding weight to this awareness campaign explaining that we all have a part to play in the prevention of the spread of pests and diseases. The campaign ran throughout the felling operations, along with educating visitors through engaging on-site interpretation activities. This project now continues with momentum, with the planned restoration of Silk Wood going ahead as a community replanting project. The replanting represents positive action for the future, as Westonbirt will put local community at the heart of the design, planting and future care of this large section of new trees in the arboretum. Again, this provides a positive public platform to explain what is involved with the fight back against disease to restore healthy, diverse and resilient woodlands.

Inspiring curiosity in the value of diversity in nature and society, in May 2023 Westonbirt co-produced an innovative four-month exhibition project 'Thinking differently about diversity'. Exploring the diversity of people and trees, the project culminated in a ten-day indoor exhibition featuring artwork created by people with experience of dementia, brain injury, learning disability, autism and/or ADHD. The project was facilitated by the Barnwood Trust and co-produced by Westonbirt and Artspace Cinderford as part of a Gloucestershire-wide community engagement project. Participants included families, young people and adults.



Workshop for 'Thinking differently about diversity' project (Rob Toomer)

The 'community shelter' continues to play a vital role at Westonbirt, to help connect a wider range of people with trees whilst at the same time improving their quality of life.

Community shelter, Westonbirt Arboretum (Piers Taylor)





Inspired by our human connection with nature and trees the exhibition was a celebration of creative expression by people who think 'differently'. Images of artwork created by the participants during a series of artist-led workshops were projected in the Great Oak Hall at Westonbirt, with a short film explaining the project. The project and exhibition were received positively by visitors and local media.

The Westonbirt team recognise that there are other under-represented groups for whom the arboretum can be difficult to access, due to lack of public transport links, the distance of travel or assistance required to make the visit. To engage these groups, Westonbirt has developed a Community Programme, with the initial support of National Lottery Heritage funding. The project reaches out to local communities to enable more people to benefit from spending time in the arboretum; to take part in activities that support better mental health and wellbeing and to better understand how we are protecting our natural world. In 2022, with funds raised by the Friends of Westonbirt Arboretum charity, the building of an inspirational new outdoor shelter was completed for use by the programme participants. The shelter is far more than just a shelter in the woods! It was designed and built with and for the community to enable the remarkable community programme to flourish and expand. During the two-year shelter build, over 600 people from under-represented audiences undertook a range of traditional green timber carpentry techniques, with participants' various skills levels carefully considered at all stages. The 'community shelter' continues to play a vital role at Westonbirt, to help connect a wider range of people with trees whilst at the same time improving their quality of life.

Jude Shackell, leader for one of the participating community groups, the Apperley Centre, said:

"The real life, interesting, fun and perceived 'riskiness' of the shelter build has been hugely motivating for the members of our group. While sometimes being a bit anxious about the tools, they have all had tremendous fun and learnt so much. They are moving on eager to learn more and try new things in all areas of their life."

Westonbirt is a perfect setting to learn, and their formal and informal education programmes continue to challenge and inspire people to engage with the natural environment. From tiny tots through to adults, the learning programme leads conversations about trees, their role in society and how we can all secure their future. In 2022, no less than 7,039 outdoor learning sessions were hosted for schools and colleges.

These are just some of the projects that leave visitors with a deeper and wonderfully intense connection to nature and trees, which in turn supports Westonbirt's mission.

Participants take part in Community shelter build (Alison Whaley)

"Almost without my telling them so, my brain cells move from their obsessive sight-based sensing to something more subtle. Yes, they [walk guides] tell me, casually - as though I'm the one fixated on the visual - the ground you are on is soft and grassy; flat and safe."
Katie Jarvis, Cotswold Life



Silk Wood, after ash dieback felling (Mike Walker)

"How many species are so close to being extinct - I'm shocked! We are so glad we can enjoy them here at the arboretum!"

Anonymous survey response

REFERENCE

Jarvis, K. 2023. Guided walk by the visually impaired at Westonbirt Arboretum, Great British Life, Cotswold Life Magazine. Cotswold Life Magazine printed edition, August 2023, <https://www.greatbritishlife.co.uk/magazines/cotswold/23667876.sensing-nature-walk-experiencing-senses-westonbirt-arboretum/>

AUTHOR

Helen Chick
 Press & Marketing Officer
 Westonbirt,
 The National Arboretum
 Tetbury, Gloucestershire
 GL8 8QS
 0300 067 4397

PROMOTING THE CONNECTION WITH NATURE THROUGH ETHNO-KNOWLEDGE AND CULTURAL ACTIVITIES



Araribá JB is situated in one of the most degraded biomes on the planet. The garden uses a range of community/nature integration strategies to connect visitors with nature. This includes activities such as artistic manifestation on the trails, providing knowledge about flora, fauna and ecology, as well as integrating folklore and ethno-knowledge in a playful and historical way to promote awareness and sustainable livelihoods.

In Brazil, there is a well-known song that goes, "quando a gente gosta, é claro que a gente cuida!" which translates to "when we like something, of course, we take care of it!" This lyric has always guided the activities conducted by the Araribá Botanical Garden.

Over the past few decades, our society has distanced itself from nature, erasing the clear interdependence between humans and the environment. The mere distinction between the terms "humans" and "environment" or "nature" highlights this separation rather than the integration that once existed. Nature on one side, seen as something to be dominated and exploited, and humans on the other, believing themselves to be "superior" as they command from their cities. This distancing has contributed significantly to the disconnect from nature.

Through artistic expression, events, and educational activities involving music, theatre, poetry, and dance, such as "Cultural Mornings," the public becomes engaged with the splendour of the flora.

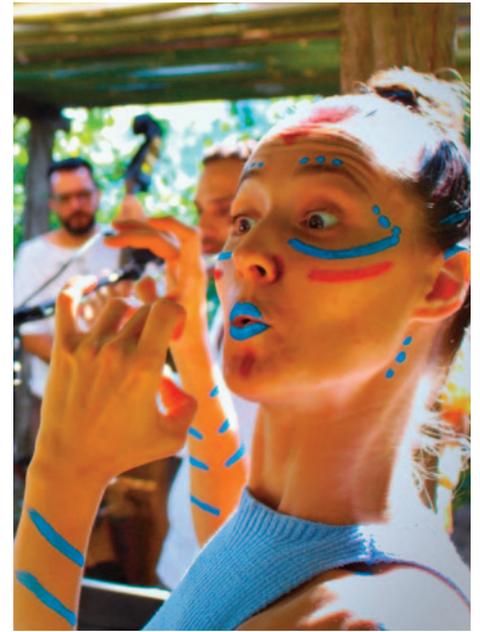


In this context, approximately 38 years ago, the first activities aimed at reconnecting with nature were initiated by what is now known as Araribá Botanical Garden, promoting livelihood through the restoration and harmonious coexistence with nature.

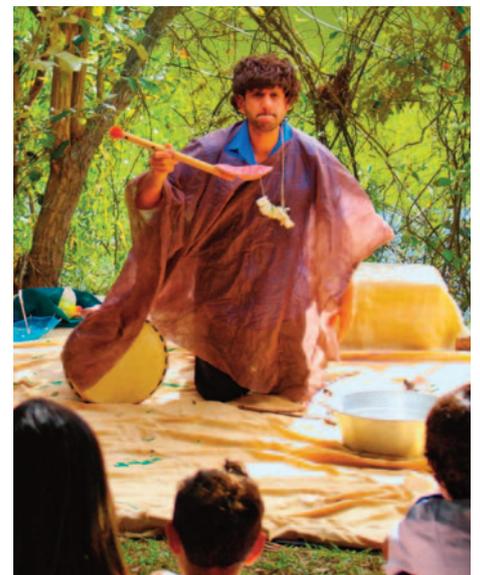
Araribá Garden is located in the countryside of the state of São Paulo, Brazil, in the city of Amparo. It is situated within one of the most devastated biomes on the planet, the Atlantic Forest. This biome is of great importance, as it covers approximately 13% of the national territory, is one of the world's most biodiverse areas, and houses around 60% of Brazil's population and a significant portion of its biodiversity (IBGE, 2004). Over the years, due to the separation from these areas and extensive biome destruction, with only approximately 7% of its original biome remaining, the need to protect and restore this biome has become increasingly critical (IBGE, 2004).

Hence the connection to the aforementioned song, which serves as one of the guiding principles of our projects. To engage the community, reconnect them, and encourage them to preserve, conserve, and restore this biome, a sense of belonging and integration is essential. As the song suggests, “quando a gente gosta, é claro que a gente cuida!” (When we like something, of course, we take care of it!), this sense of belonging and integration is awakened when people learn, coexist, and understand the importance and necessity of preserving this environment for their own lives while having the means to sustain their daily lives within it.

The strategy chosen by Araribá BG to engage people and protect this biome involves bringing the community closer to nature through activities integrated into their daily lives. It doesn't necessarily involve traditional environmental education systems or solely conservation or restoration activities. Therefore, Araribá developed two key projects “Art and Nature” and “Health and Nature,” a set of artistic and interactive activities within the JB's conservation areas and paths among plant collections.



In Brazil, there is a well-known song that goes, “quando a gente gosta, é claro que a gente cuida!” which translates to “when we like something, of course, we take care of it!”





Through artistic expression, events, and educational activities involving music, theatre, poetry, and dance, such as “Cultural Mornings,” the public becomes engaged with the splendour of the flora. They are guided by our team of monitors, observing the characteristics of flora and fauna. At specific locations along the trails, they encounter the team of artists, who invite participants to interact, sing about the four seasons, dance, and engage in the interpretation of poetry. This sensory experience introduces them to the four basic elements of nature: earth, water, air, and fire, leading to reflection on their own daily lives and their impact on the environment.

Based on ethno-knowledge research from various regions of Brazil, the knowledge of indigenous/native peoples and ancient local residents served as inspiration for the development of “Cultural Trails.” We incorporate teachings of life in the forest into the characters who accompany the activities. These teachings revolve around respecting nature to have a constant supply of food, medicine, pure water, and shelter. Characters from national folklore, portrayed by our team of artists, also accompany and convey the cultural teachings of these figures, who always present themselves as protectors and guardians of the forest, including “Curupira, Saci-pererê, Mula sem cabeça, Caipora, Negrinho do Pastoreio, Iara-mãe d’água, Boitatá.” In this playful manner, we sow the seeds of future “Guardians of Nature on the Planet” in every mind and heart. This is how we transmit knowledge about medicinal plants, soil indicator plants, plants providing fibres for clothing and housing, and many, many plants that sustain us as food.

The culmination of these activities comes with the “Health and Nature” project. In addition to all the experiences enjoyed through art, we also present the biochemical actions of phytohormones when we are in the presence of trees and plants in a forest. This reinforces the immune system, lowers blood pressure, reduces cortisol (the stress hormone) levels, decreases sympathetic nervous system activity, and allows all participants to emerge from this “Forest Bath” (García, H., Miralles, F., 2018, and Miyazaki, Yoshifumi, 2018) with improved concentration and balanced moods.

Sustainability and results

These activities are being made available to the public in two formats: the “Cultural Trails Project”, offered free of charge to 2,000 students from the public school system, funded by regional and national companies. The “Cultural Mornings Project,” is open to a general family audience, through ticket purchases with bi-monthly programming for 200 participants per year. This is now being expanded with the sponsorship of local businesses within the hospitality and grocery sectors.

REFERENCES

IBGE, 2004. Mapa de Biomas Brasileiros [online] Available at: <https://brasilemsintese.ibge.gov.br/territorio.html> (accessed: 20 August 2023)

MARTINS, T. P. 2022. O dispositivo do transtorno do déficit de natureza: um estudo sobre a importância do contato com a “natureza” para a saúde dos sujeitos. 378 f. Tese (Doutorado em Educação em Ciências) – Universidade Federal do Rio Grande do Sul, Instituto de Ciências Básicas da Saúde, Porto Alegre, 2022.

Neiman, Z. 2007. A educação ambiental através do contato dirigido com a natureza (Doctoral dissertation, Universidade de São Paulo).

Louv, R. 2006. Last child in the woods: saving our children from nature-deficit disorder. Estados Unidos, Algonquin Books.

García, H., Miralles, F. 2018. Shinrin-yoku. El arte japonés de los baños de bosque. Espanha: Editorial Planeta.



Integral development of the human being – intellectual, emotional, social, spiritual, and physical

These experiences in direct contact with nature, combined with ancestral teachings, enable the development of the human being on all levels (Louv, R., 2006), aiming for the integral development of the human being – intellectual, emotional, social, spiritual, and physical, these experiences:

1. Stimulate the senses, leading to a broader perception of our surroundings, encouraging creative and cooperative actions.
2. Promote direct health benefits, a practice long promoted by traditional and indigenous peoples as essential for physical, mental, emotional, and spiritual health.
3. Inspire moments of concentration, offering experiences of beauty, enhancing internal balance and harmony.
4. Foster social bonds and non-violent communication, allowing individuals to coexist in constantly changing situations, realizing the importance of collaboration and care for one another.
5. Develop competence and resilience, as interaction with the environment teaches assessment, risk-taking, resilience in the face of adversity, and the autonomy to choose and learn from these experiences.
6. Contribute to nature conservation by fostering critical and conscious consumption, driven by an appreciation of natural beauty and simplicity, shifting away from competitive consumption logic.

The knowledge of indigenous and traditional peoples is organised around nature and its life cycles (Martins, 2022). Hence, the importance of reuniting society to experience ecological processes and natural cycles and to work on the knowledge of harmonious coexistence, respect, and conscious use of natural resources. To make this a strategic process with the purpose of rethinking values, capable of reorientation, activities must be planned to rekindle human enchantment with the environment. This can promote a shift in current societal paradigms, which is essential for a transformation of consciousness and behaviour (Neiman, 2007).

Through initiatives that promote positive feelings and experiences leading to a shift in concepts and the reestablishment of broken bonds, there is still hope to raise awareness of the importance of environmental preservation and restoration. There is indeed a light at the end of the tunnel, or could it be a light at the end of the trail?



REFERENCES CONTD

Yoshifumi, M. 2018. Shinrin-yoku: Terapia japonesa dos banhos de floresta que melhora a sua saúde e bem-estar, Albatroz, SP ,4a. edição.

Kempton, B. 2018. Wabi Sabi: Japanese Wisdom for a Perfectly Imperfect Life.

EcoPsicologia Brasil. Banho de Floresta. Retrieved from <https://ecopsicologia-brasil.com/banho-de-floresta/>

Floresta Terapia. Floresta Terapia. Retrieved from <https://florestaterapia.com.br/florestaterapia/>

Nature and Forest Therapy. Nature and Forest Therapy. Retrieved from <https://www.natureandforesttherapy.org/>

All images: Araribá Botanical Garden (Guaraci M Diniz Jr)



AUTHORS

Guaraci M. Diniz Jr. -
General Manager
Araribá Botanical Garden
projetos@gaea.org.br

Luiz H. R. Baqueiro -
Biologist / Project Manager
GAEA (Environmental Studies and
Action Group)
luiz.baqueiro@gaea.org.br

NURTURING NATURE'S WISDOM: JNTBGRI GARDEN'S BRIDGE FOR FOREST OFFICIALS



Amid the tech-driven urban rush, we often lose touch with nature. Yet, gardens like Jawaharlal Nehru Tropical Botanic Garden and Research Institute (JNTBGRI) offer a bridge. Nestled in Kerala, India, JNTBGRI blends nature's beauty with learning. It educates on plant research, conservation, and the environment, while also hosting events. With over 4500 taxa, it's an oasis of biodiversity. The garden links visitors to nature's importance, promoting sustainable practices. Training forest officials amplifies conservation awareness, fostering actions to safeguard Earth's future. JNTBGRI's lush landscapes remind us to be stewards of our planet's vitality.

Introduction

In today's fast-paced world, where technology and city life dominates our lives, it is easy to lose touch with the natural world around us. However, even in the midst of our busy lives, there is a place where we can still experience the serenity and beauty of nature- the garden. Gardens play a vital role in bridging the gap between our urban lifestyle and the raw, untamed beauty of the natural world. They provide us with a chance to step away from the concrete jungles and digital screens, offering a precious opportunity to reconnect with the environment in a meaningful way.

Above: Awareness on rare orchids (JNTBGRI)

Annually, over 25,000 individuals from diverse backgrounds visit the garden, which serves as both a hub of knowledge and a recreational space.

Garden as nature's classroom

There is one special place that truly shows this connection- Jawaharlal Nehru Topical Botanic Garden and Research Institute (JNTBGRI), located in the heart of Palode, Thiruvananthapuram, Kerala, India. The garden isn't just about beauty but it's also a hub for learning and raising awareness about plants and nature. It teaches people about parts of plant research, protecting plants, and understanding the environment. The garden is also a great place for sharing information. People can click photos, make videos, write things down, and organize events to spread the word about the garden and its mission. JNTBGRI is like a champion for plants, working hand in hand with the Global Strategy for Plant Conservation (GSPC) and other important nature agreements. It's a place where beauty meets education, and where plants get the attention they truly deserve.

Jawaharlal Nehru Topical Botanic Garden: Nurturing the bond

JNTBGRI is nestled in the natural forest land in the lap of the Western Ghats. It is spread over 300 acres of land area which is considered to be one of the biggest conservatory gardens in Asia with over 4500 plant species/varieties/cultivars. The garden has lots of different parts, each with its own special plants. There is an Arboretum, a Palmetum, a Bambusetum, an Ornamental Garden, a Medicinal Garden, and even a place called the Field Gene Bank for Medicinal and Aromatic Plants. There are also five Orchidaria, which are like homes for orchids, and areas for Ferns and Gymnosperms. You can also come across places like the Rockery, Rosary, Rare Endangered and Threatened Park. But that's not all - the garden has a Conservatory for plants from the Andaman and Nicobar Islands, Carnivorous plants, special collections like cycads, ficus, cacti and succulents, water plants, jasmines, gingers, and peppers. It's like a treasure trove of plant diversity!

From Connection to action: Cultivating a culture of conservation

The JNTBGRI garden welcomes the public every day from 9:00 am and 3:00 pm, except on public holidays. Annually, over 25,000 individuals from diverse backgrounds visit the garden, which serves as both a hub of knowledge and a recreational space. The displays within the garden are designed to be largely self-explanatory, aiming to convey the significance of plant diversity and the urgency of conserving and sustainably utilizing these resources. In line with this mission, visitors have the opportunity to obtain saplings and various herbal products at a nominal cost. Furthermore, the garden plays an active role in human resource development. It periodically organizes educational and awareness programmes tailored for students at the school and college levels, as well as for farmers and young professionals. These programmes are conducted through engaging training sessions and workshops.



Anthurium collection (JNTBGRI)



Lady's Slipper Orchid (*Paphiopedilum druryi*) (JNTBGRI)

In the tapestry of life, gardens are threads that weave a narrative of connection, understanding, and responsibility.

A panoramic view of JNTBGRI (JNTBGRI)





The garden also extends its expertise to the realm of environmental impact assessment studies and consultancies. These services cater to specific areas of expertise, contributing to sustainable practices in their respective domains. The garden holds a special place for a variety of individuals, including practitioners of traditional healthcare systems, faculties, environmentalists, researchers, and students who frequently visit. Additionally, it serves as an educational destination for newly appointed foresters and other forest officials from different parts of the country, forming an integral part of their official training. Throughout the period of 2022-23, a total of circa 700 individuals representing 16 groups from Kerala, Odisha, Tamil Nadu and Uttarakhand affiliated with forest departments visited the garden.

Training forest officials in the Western Ghats conservation

The training for forest officials centres on the biodiversity's paramount importance, with a spotlight on the floral richness of the Western Ghats, a recognized biodiversity 'hotspot'. Participants gained insights into natural and anthropogenic threats to this biodiversity, while also delving into the significance of endemism. JNTBGRI's adept conservation strategies for endemic plants were highlighted, alongside the institute's success in conserving threatened plant species like *Buchanania barberi* (Critically Endangered), *Cinnamomum riparium* (Endangered), *Cycas beddomei* (Endangered), *Garcinia imbertii* (Critically Endangered), *Hopea ponga* (Vulnerable), *Madhuca bourdillonii* (Endangered), *Myristica malabarica* (Vulnerable), *Nepenthes khasiana* (Endangered), *Piper barberi* (Endangered), *Pterocarpus santalinus* (Endangered), *Vateria indica* (Vulnerable). The participants also relished their introduction to *Chenkurinji* (*Gluta travancorica*), a tree endemic to South Western Ghats, which commemorates the name of Shendurney Wildlife Sanctuary. The session extended to captivating plant-animal interactions, spotlighting species with specific associations with mammals such as bats and lion-tailed macaques. The training equipped forest officials with a holistic understanding, fostering awareness and informed decision-making to preserve these delicate ecosystems effectively.

The training addressed the detrimental impact of unscientific Non Wood Forest Produce (NWFP) harvesting on *Asparagus racemosus*, *Bombax ceiba*, *Calamus andamanicus*, *Canarium strictum*, *Caryota urens*, *Coscinium fenestratum*, *Cymbopogon flexuosus*, *Desmodium gangeticum*, *Ochlandra travancorica*, *Phyllanthus embilica*, etc. Detailed sustainable harvesting methods were highlighted, stressing the importance of educating raw collectors of NWFP to prevent destructive practices. The training emphasized participants for raising awareness on sustainable harvesting practices among forest dependent communities via Vanasamrakshana Samithis (VSS) to bolster Forest Department initiatives, forming a cohesive effort for conservation.

Introduction to live plants collection of JNTBGRI (JNTBGRI)

Jawaharlal Nehru Tropical Botanic Garden and Research Institute is nestled in the natural forest land in the lap of the Western Ghats. It is spread over 300 acres of land area which is considered to be one of the biggest conservatory gardens in Asia with over 4500 plant species/varieties/cultivars.



Entrance to palmatum (JNTBGRI)



Giant water lily (*Victoria amazonica*) (JNTBGRI)



Demonstration at carnivorous plant house (JNTBGRI)



Forest officials learning journey through conservatories

During the training, forest officials eagerly explored the diverse conservatories, immersing themselves in the wealth of plant species. They took full advantage of the opportunity to familiarize themselves with significant species of both conservation and economic value. Learning to distinguish closely related species, such as *Pterocarpus marsupium* (Indian Kino Tree) and *Pterocarpus santalinus* (Red Sander), was a fascinating highlight. The visit to the Medicinal plant garden deepened their understanding of potential rare species and traditional herbal remedies used by tribal communities for primary healthcare. The Orchidarium's indigenous species as well as novel and beautiful hybrid flowers captivated their attention, while the Palmetum field conservatory shed light on palm diversity and its economic and ecological importance. Exploring bamboo and reed species at the Bambusetum, officials grasped structural variations, environmental impacts, and social-economic values. The visit was marked by lively interactions and active note-taking, showcasing their keen involvement.

Conclusion: Nurturing a greener future

As forest officials walk through the JNTBGRI's vibrant landscapes, they not only witnessed the splendour of nature but also recognized their role in its protection. This recognition is the first step towards action - action that involves adopting sustainable practices, supporting conservation initiatives, and advocating for policies and legalities that safeguard our planet's future. In the tapestry of life, gardens are threads that weave a narrative of connection, understanding, and responsibility. The Jawaharlal Nehru Tropical Botanic Garden and Research Institute stands as a beacon of hope, inspiring us to embrace our role as stewards of the Earth. It is a living testament to the transformative power of nature and its capacity to nurture not only plants but also the seeds of change within us all.

Species at the Orchid house (JNTBGRI)



Interactive session with forest staff (JNTBGRI)

AUTHOR

Plant Genetic Resource Division,
Jawaharlal Nehru Tropical Botanic
Garden and Research Institute,
Karimancode, Palode- 695562,
Thiruvananthapuram, Kerala, INDIA

Corresponding author: Anurag Dhyani
(anuragdhyani@gmail.com)

MAKING CONSERVATION PERSONAL WITH THREATENED CAPE LOWLAND HABITAT DISPLAYS



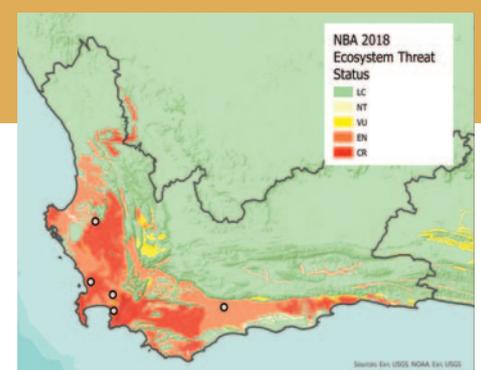
Lowland habitats in the Cape Floristic Region are threatened due to human-driven habitat loss. Protecting what remains of them includes facilitating connections between people and these habitats to ensure long-term positive conservation outcomes. To this end, Stellenbosch University Botanical Garden created threatened Cape lowland habitat displays.

A visitor takes a picture of a terrestrial Cape orchid in the undescribed alluvial habitat display bed (Annerie Senekal)

The Cape Floristic Region at the southern tip of Africa is one of the world's biodiversity hotspots. Over 9000 plant species occur here in about 90 000 km², with nearly 70% endemic to the region^[1]. Geological, altitudinal, edaphic and micro-climatic diversity interact to create a variety of habitats that are home to many habitat-specific plant species (Linder, 2003).

The Cape flora has the highest plant species extinction rate of continental floras globally (Humphreys et al, 2019),, mainly due to habitat loss (Skowno et al, 2018). This loss is more pronounced in the lowlands than in the mountains. The steep, rocky sandstone mountains with their nutrient-poor soils are mostly untransformed as they are not suitable for large-scale human habitation or agriculture. In contrast, the lowlands have fertile soils and a flatter topography suitable for agriculture and urbanisation, and consequently have been severely transformed^[9].

Protection and visibility of mountainous and lowland habitats are also not equal (Ntshanga et al, 2021). Nature reserves cover large areas of these mountains and offer hiking and cycling trails, campsites and cottages for people to enjoy. Most of the lowlands are on private farms with minimal public access, and habitat fragments in urban areas are under constant pressure as the demand for housing increases.



The Western Cape province with each habitat's threat status indicated by colour (see legend). Each white dot indicates a site that is represented in a threatened lowland habitat display bed at SUBG. The habitats indicated are Swartland Shale Renosterveld (CR), Cape Flats Sand Fynbos, (CR), Boland Granite Fynbos (EN), unmapped Winelands Alluvial habitat (likely CR) and Eastern Rûens Shale Renosterveld (EN) (Created with South African National Biodiversity Institute, 2018.)



To effectively protect what remains of these threatened lowland habitats, landowners, municipalities and the public need to be convinced of their value. Botanical gardens are visited by diverse groups of different ages, professions and abilities and have an opportunity to facilitate personal, intimate, and lasting relationships between people and these habitats. In 2021, Stellenbosch University Botanical Garden (SUBG) received funding from the Table Mountain Fund to display threatened Cape lowland habitats. This project's primary aim is to enable visitors to form connections with these habitats in a way that would lead to long-term positive conservation outcomes. Nine habitat beds have been constructed and planted to date, representing five threatened Cape lowland habitats.

Connecting through displays

To facilitate meaningful connections between visitors and these habitats, it is important to represent these habitats as accurately as possible. Underlying habitat substrate geology is displayed in each bed's retaining wall to emphasise the geological diversity of the Cape lowlands and habitat specificity of many species represented in the beds while also bringing them closer to eye-level for easier engagement and accessibility. Site soil is often used as growing medium to display edaphic diversity. Habitat appearance and composition is accurately represented based on staff's field observations. Repeat visits to these habitats to collect seeds, cuttings and divisions ensure that most species present in each habitat are represented in display beds. Landscape features are incorporated to tie the displays together, for example shale outcrops in one habitat and alluvial stone scattered across another. All these features paint a holistic picture of each habitat and bring their diversity to life.

The Cape Floristic Region has a Mediterranean-type climate with wet winters and dry summers. Many Cape species have a dormant phase in summer, which is often interpreted by garden visitors as death or neglect. Displaying ecological adaptations like dormancy with appropriate interpretation will facilitate a deeper understanding of these habitats and will also have beneficial consequences for their conservation. Lowland habitat fragments that are visited during summer are easily mistaken as degraded and desolate. Environmental impact assessments conducted during this season when many plants are surviving in underground storage organs lead to highly unrepresentative assessments of habitat diversity. This can lead to the development of the site and further biodiversity loss.

Connecting through interpretation

Engaging, well-researched and aesthetically pleasing information boards are written in a popular science style and designed by SUBG staff to accompany these displays. Various habitat features are covered in interpretation to ensure a holistic understanding of habitats. This includes interpretation of geological substrates, species composition and ecological processes. In future, interactive material such as species lists to encourage "treasure hunts" and questions that encourage sensory engagement could be included.

The threatened Cape lowland habitat display beds at Stellenbosch University Botanical Gardens (Annerie Senekal)

REFERENCES

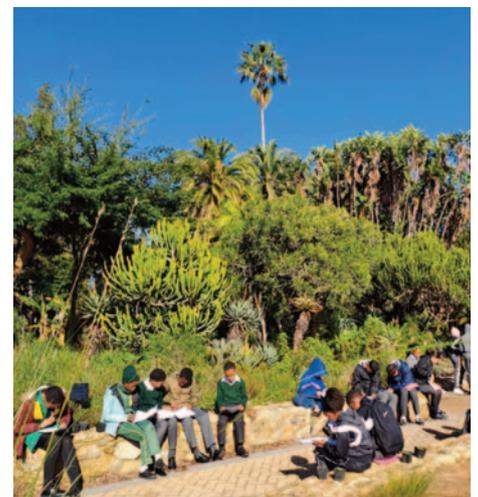
Manning, J., & Goldblatt, P., 2012. Plants of the Greater Cape Floristic Region 1: the Core Cape flora, *Strelitzia* 29. Pretoria: South African National Biodiversity Institute.

Linder, H.P., 2003. The radiation of the Cape flora, southern Africa. *Biological Reviews*, 78(4), pp.597-638.

Humphreys, A.M., Govaerts, R., Ficinski, S.Z., Nic Lughadha, E. & Vorontsova, M.S., 2019. Global dataset shows geography and life form predict modern plant extinction and rediscovery. *Nature ecology & evolution*, 3(7), pp.1043-1047.

Skowno, A.L., Poole, C.J., Raimondo, D.C., Sink, K.J., Van Deventer, H., Van Niekerk, L., Harris, L.R., Smith-Adao, L.B., Tolley, K.A., Zengeya, T.A., Foden, W.B., Midgley, G.F., & Driver, A., 2019. National biodiversity assessment 2018: the status of South Africa's ecosystems and biodiversity. Pretoria.

Ntshanga, N.K., Procheş, S. & Slingsby, J.A., 2021. Assessing the threat of landscape transformation and habitat fragmentation in a global biodiversity hotspot. *Austral Ecology*, 46(7), pp. 1052-1069.



School students complete curriculum-based worksheets at the threatened Cape lowland habitat displays (Bruce Esau)



Threats to Cape lowland habitats and extinction rates form part of interpretation on information boards, but clear calls to action that are accessible to visitors of various ages and botanical backgrounds are also emphasised. These include guidelines for querying environmental impact assessments of developments, and encouragement to join local citizen science groups to contribute to species monitoring and resources to learn more about Cape lowland habitats and species.

Connecting through education and research

These habitat displays are used to illustrate biological and ecological concepts, such as reproductive biology, pollination ecology, evolution, seasonality, diversity and endemism in our educational tours for visitors. Lessons for school children planned and hosted by SUBG staff incorporate aspects displayed in habitat beds to emphasise concepts in school curricula. The beds are also used in botany and conservation subjects at Stellenbosch University, such as angiosperm diversity and plant anatomy.

Some species housed in these beds are the subject of scientific research to inform conservation decisions. The endangered *Haemanthus pumilio* (Snijman, et al, 2004), is being studied by Dr Paul Hills and his lab at the Institute for Plant Biotechnology at Stellenbosch University to develop a micropropagation protocol for this threatened species. The critically endangered *Oxalis fragilis* (Dreyer et al, 2012), was the subject of a recent postgraduate research project at Stellenbosch University that investigated the complex tristylous reproductive system of this species to inform its ex situ conservation management.

Ex situ conservation

Although not its main focus, these displays provide an opportunity for ex situ conservation. *Pelargonium fergusoniae*, *Haemanthus pumilio*, *Moraea villosa* and *Oxalis fragilis* are some of the threatened Cape lowland species that form part of conservation-grade ex situ collections at SUBG and can be found in these displays.

Future perspectives

The next step in the development of these displays is to obtain feedback from a diverse group of visitors to determine whether our messages are coming across effectively. These displays will evolve continuously as we learn how to communicate our passion for these habitats to our visitors.

We would like to acknowledge the Table Mountain Fund for funding this project.



Underlying habitat substrate geology is displayed in beds' retaining walls (Annerie Senekal)

REFERENCES CONTD

Rouget, M., Richardson, D.M. & Cowling, R.M., 2003. The current configuration of protected areas in the Cape Floristic Region, South Africa—reservation bias and representation of biodiversity patterns and processes. *Biological conservation*, 112(1-2), pp.129-145.

South African National Biodiversity Institute, 2018. Terrestrial ecosystem threat status and protection level layer [Vector]. Available from the Biodiversity GIS website (<http://bgis.sanbi.org/SpatialDataset/Detail/2675>), downloaded on 11 August 2023

Snijman, D.A. & Victor, J.E., 2004. *Haemanthus pumilio* Jacq. National Assessment: Red List of South African Plants version 2020.1 [online]. Available at: <http://redlist.sanbi.org/species.php?species=2085-39> [Accessed on 2023/09/08]

Dreyer, L.L., Oberlander, K.C & Pillay, D., 2012. *Oxalis fragilis* T.M.Salter. National Assessment: Red List of South African Plants version 2020.1 [online]. Available at: <http://redlist.sanbi.org/species.php?species=1794-122> [Accessed on 2023/09/08]



Haemanthus pumilio (endangered) and *Oxalis fragilis* (critically endangered) are two threatened species from the Cape lowlands that are the subjects of recent or ongoing academic research to inform conservation decisions (Annerie Senekal, Dr Donovan Kirkwood)

AUTHOR

Annerie Senekal
Assistant Curator at Stellenbosch University Botanical Garden
amsenekal@sun.ac.za

A PERFECT MATCH – ARTISTS IN THE BOTANIC GARDEN



Relations between artists and gardens have spanned centuries and have always been close, even intimate. In this article, I will talk about the friendship between the University of Warsaw Botanic Garden (UWBG) and young artists – students of the Faculty of Design at the Warsaw Academy of Fine Arts. We believe that the nature and knowledge of plants can inspire young artists and, in turn, that their works presented in UWBG sensitize and broaden the perspective of our visitors. In line with the mission of UWBG, we seek to demonstrate the diversity of plants in all its manifestations and versions – also to provide a source of inspiration and raw material for artists. That is why, for several years now, we have been inviting young artists who share our fascination with nature to the garden.

Artists have been connected to nature for centuries, and it is undoubtedly an intimate relationship. They are present in it, co-create it and draw inspiration from it. First the art influenced the gardens. In the 16th century, gardens were designed based on the landscapes painted by artists from imagination. Italian landscapes captured in the artists' paintings were eagerly transferred to aristocratic gardens. It was only a little later, around the 19th century, that gardens began to influence artists. At that time, numerous urban home gardens were created. The ability to decide on one's own space and the need to design backyard greenery for pleasure and beauty have become important. Sometimes the connection between man and the garden was so serious that it turned into a kind of relationship. Gustave Caillebotte, Camille Pissarro, Henri Matisse, Paul Klee and Wassily Kandinsky are just some of the artists who mixed using gardening tools with a painting palette (Hubeny-Żukowska, 2021).



Above: "SMELL" – exhibition catalogue (Izabela Kuzyszyn, UWBG 2023)
Top: Frida Kahlo "Roots" (1943) Courtesy of www.FridaKahlo.org

Gardens are for the people. The space is designed to be used. People are sitting on benches, a young couple is walking nearby, children are hanging around between flower beds. Someone is sitting on the grass alone in their thoughts, someone else is taking a picture. Gardens are full of greenery, magical passages, intense scents and colours of summer, wind and sounds of nature – rustling leaves underfoot, buzzing insects, rustling trees, birds. There is also water. Let's look at gardens through the eyes of artists.

In 2019, the University of Warsaw Botanic Garden (UWBG) began a cooperation with the Faculty of Design of the Academy of Fine Arts in Warsaw (AFAW). Since then, an exhibition of works by young artists has been prepared annually at the UWBG. Every year we invite a different studio from the above-mentioned faculty of the AFAW to cooperate with us.

Imagine we are in the UWBG at the opening of the exhibition called "SMELL", showing works of the students of the Faculty of Design at the AFAW. The smell of plants inspired young artists this year (2023). From the beginning of the creative process, they were interested in how botanists define smell. We organized an introductory lecture for them entitled "The secret language of plants", which was delivered by the Director of the Botanical Garden, Prof. Marcin Zych. Who do plants smell for? Do plants use scent to perpetuate the species? How do plants communicate with their pollinators? Over the next few weeks, students visited the garden and consulted their ideas with their tutors: Prof. Ksawery Piwocki and Dr. Jakub Marzoch, as well as with the employees of the Botanical Garden of the University of Warsaw.

Students asked bold questions, passionately talked about their ideas, trying to place them in the surroundings of the aromatic Botanical Garden. Beautiful and engaging works were created. The clever and extraordinary objects reminded visitors of the sense of smell, allowing them to stop for a moment and smell.

The artist's tenderness towards nature undoubtedly has an intimate dimension. They notice not only the beauty of plant shapes and forms, but also the beauty of the constant processes of change in nature and the relationships between individual groups of plants and animals. And it is this sensitivity that supports the artist's relationship with the world of nature.

We also observed this process in 2021, when students of the Faculty of Design of AFAW prepared projects for visual communication of nature interpretation in our Garden. They worked in small groups of 2-3 people under the supervision of their substantive supervisors, lecturers of the Studio of Basics of Designing Visual Communication: Dr. Magdalena Małczyńska-Umeda, MA. Jakub Jezierski, Prof. Wojciech Małolepszy and Dr. Robert Pludra. During the implementation, they shared their ideas not only with the professors, but also with the employees of the Garden – curators of individual sections.

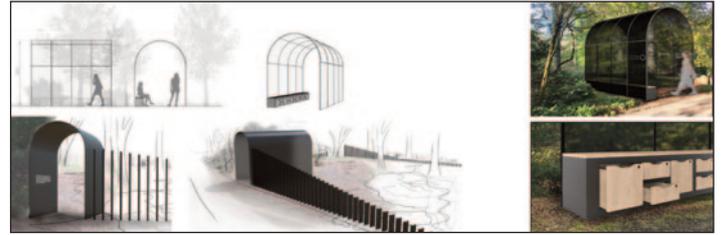
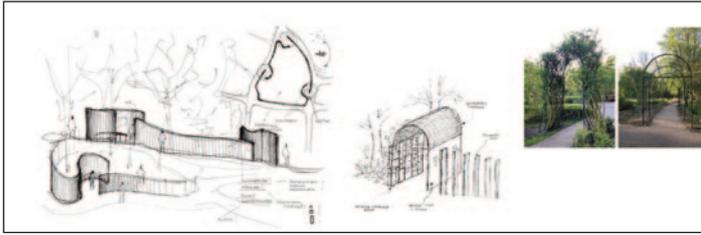


Opening of the exhibition "SMELL" (works by students of the AFAW) in the UWBG (Izabela Kuzyszyn, UWBG 2023)



Guests at the opening of the "SMELL" exhibition. All items at the exhibition were made of biomaterials, which include, among others: agar, sodium alginate and carrageenan (Izabela Kuzyszyn, UWBG 2023)

Project "Sensory sanctuary – development project of the carpathian beech forest area in the UWBG"; authors: Emilia Sztandera, Michalina Wróblewska; We asked one of the design groups to help us redesign the Carpathian Beech Forest Area in our Garden. There is no clear, convincing invitation to actively use this space. It looks like it doesn't exist. In our opinion this space offers pleasure in the shade of trees and smells of a real beech forest. We would like to be able to invite our guests there. In student's response, we received a very interesting project inviting us to forest bathing called "shinrin-yoku". The authors focused on the entrance area to show our guests that there is something interesting hidden in this part of the Garden. (Documentation department of the Faculty of Design of the AFAW)



As a result, in June 2021, 13 projects were presented. Truly unique design solutions were created, which presented a very high design and graphic level. The students took into account specificity of the Garden and proposed very attractive educational solutions.

Both mature artists and young adepts of art manifest the curiosity and innocence of a child, the need to explore the world up close, tangibly, not from afar. This courage, inquisitiveness and the ability for in-depth contemplation of the landscape make it easier for creative individuals to find their way in our Garden. At the same time, the ability to contemplate is probably of particular importance. The artist not only notices the landscape, but can also immerse themselves in it, searching for deeper meanings (Królikowski & Rykała, 2016).

A perfect combination

On May 12, 2020, at night, after rainfall and a strong wind, we lost one of the “good guardian spirits” of our garden – a common beech (*Fagus sylvatica*) fell over. It certainly remembered the time of the birth of the Garden, it was probably even mentioned in the first list of plants from 1820. At night, it leaned against a boulder commemorating Prof. Andrzej Batko, an extraordinary scientist and teacher, curator of the Garden in 1987–1997.

– It is a huge loss, to nature as well as sentimental. It is hard for me to imagine the Garden without this monumental tree, but these are the inexorable laws of nature, life and death are irrevocably inscribed in them – wrote the Director of the Garden, Prof. Marcin Zych.

In our Botanical Garden, some of the trunks of old trees blown over by the wind are left. Dead wood is the living environment of many species of organisms (especially saprotrophic fungi and saproxylic insects). Therefore, the fallen beech of Prof. Batko in the most part remained in the Garden.

Another implemented idea was to use the remaining wood from the fallen or cut trees in such a way that they could return to the Garden in a different form – it was decided to give it to the artists from the Faculty of Design at the Academy of Fine Arts in Warsaw. A piece of an old, dying tree would be saved in an art or a craft.

Above: Project “Sensory sanctuary – development project of the carpatian beech forest area in the UWBG”; authors: Emilia Sztandera, Michalina Wróblewska; Stage: visualizations, inspirations, design references. (Documentation department of the Faculty of Design of the AFAW)

Artists have been connected to nature for centuries, and it is undoubtedly an intimate relationship.

Cooperation with the students of the Academy of Fine Arts generates a beautiful and creative relationship, and is appreciated by numerous guests visiting the garden.

Project “Sensory sanctuary – development project of the carpatian beech forest area in the UWBG”; authors: Emilia Sztandera, Michalina Wróblewska; Stage: inspirations, design references (Documentation department of the Faculty of Design of the AFAW)



In the winter of 2020, when the huge red oak was cut down due to a disease, it was cut into pieces and sent to the workshop of an artist designer - Paweł Jasiewicz. In 2022, we organized his individual exhibition in the Garden: "If a tree falls in the forest – and there is no one around to hear it"

– The noise a tree makes when it falls is terrifying. It is sad to know about the end of something as beautiful as a tree with a wide crown and history written in its trunk. The primal force contained in the natural giant seems to be something endless, primal, giving solace and joy. The fall of even a small tree evokes astonishment and often pain – wrote the artist in the introduction to the exhibition catalogue. The tenderness with which the artist treated the fragments of the old tree trunk only confirms that a better decision could not have been made. In the production of "Shells vessels", the described oak returns as a memory of something magnificent that has passed away, and its remnants remind us of the glory days. Like the hulls of great sailing ships washed ashore. The objects remind us of the inevitable end, even of what is beautiful and monumental.

In the spring of 2021, a group of students from Bartłomiej Mejr's Ceramics Design Studio and Paweł Jasiewicz's Experimental Wood Studio prepared an exhibition "Design inspired by nature" at UWBG.

The exhibition showcased various objects made by students inspired by the garden and nature. There were colourful hotels for solitary bees made of ceramics, a waterer for bees and a house for bumblebees dug into the ground. Sound and rain catchers were also created. Additionally, the students also proposed solutions for benches for the garden and the courtyard of the design department. One of these projects was a seat attached to the tree trunk, which, after duplication, could be used as steps to climb the tree crown.

The leitmotif in the educational offer of the UWBG in 2022 were plant-derived fibres and colours. Hence the cooperation with the Faculty of Design at AFAW resulted in another exhibition – "WEAVE. Between culture and nature". The objects created by the third-year students in the Textile Design Studio run by Dr. Magdalena Komar (Fashion Department of the Faculty of Design) were presented in the garden and the greenhouses. The starting point of their work was fabric, and the context were objects of everyday use. This relation is where nature and culture lose their everyday, autonomous meaning. At the first glance, fabric can be treated as a pure product of material culture - woven, knitted, manipulated by man for thousands of years. However, if we take into account 20th-century discoveries in the field of neuroscience, we must accept that "the foundation of the conscious mind is the body", and the fabric - coming out from under our fingers - is the product of our haptic imagination, in which all our senses participate. Doesn't it belong to the natural world? – wrote Magdalena Komar in the introduction to the exhibition catalogue. [...] Each of the objects is a personal commentary on the relationship of modern man with nature, and all this takes place in the space of the Botanical Garden – a place where a man, taken over and fascinated by Nature, decided to study it.

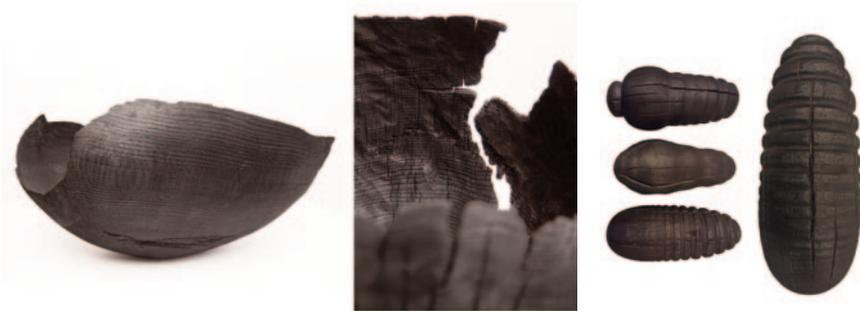


Project "Smell the City", author: Emilia Czajka; social campaign promoting scented walks - the so-called smellwalking – a type of sensory walks that involves checking the relationship between smells and space. The student, together with the garden guests, created the Garden Smell Map; Exhibition "FEEL"; UWBG 2023 (Documentation department of the Faculty of Design of the AFAW)



The monumental common beech (*Fagus sylvatica*) of Professor Andrzej Batko, an extraordinary scientist and teacher, curator of the Garden in the years 1987-1997 – fell in the spring of 2020 in the University of Warsaw Botanic Garden (Jarosław Deluga, 2022)

The exhibition "Design inspired by nature"; On the right: a hotel for mason bees made of ceramics, on the left: a house for aphid slayers, author: Natalia Markowicz; UWBG 2021 (Izabela Kuzyszyn, UWBG 2021)



Art is deeply rooted in nature and is an indisputable inspiration for the artists. Captivating with its beauty and diversity it is also one of the most important creative themes. It provides artists with various materials, such as wood, stone, clay, paper, etc. Let's only imagine what the colour palette or variety of textures would be like without nature... The plant and animal world offers creators an endless wealth of colours and textures that help to choose an individual language of expression. The beauty of nature, its diverse forms, life cycles and processes are an extraordinary base of inspiration for sensitive creators of artistic works.

Frida Kahlo used to say that she painted plants so they wouldn't die. She had flowers in her hair from her own garden, and her library contained many books on botany and herbal medicine. The beauty and diversity of Mexico's plants and animals have been an integral part of her work ever since, from her self-portraits and still life pieces to provocative depictions of the female experience. In her paintings, she gave plants cultural, spiritual, as well as personal meanings in an unexpected way (Zavala, 2015). During her lifetime, Frida painted about 140 paintings, 55 of which are self-portraits. In a painting entitled *Roots* (1943), Frida depicts herself as a tree of life. The painting depicts the author's frustration at not being able to bear children (due to the injuries she suffered as a result of an accident), as well as her belief that all life on earth is interconnected: plants, animals and people.

Summary

At the beginning of our cooperation with students of the Faculty of Design at the Academy of Fine Arts in Warsaw, we had some concerns: will the young artists respect the specific seriousness of the university's Botanical Garden? Will they use our knowledge and will the finished projects be understandable to our visitors? However, our fears turned out to be unnecessary. Cooperation with the students of the Academy of Fine Arts generates a beautiful and creative relationship, and is appreciated by numerous guests visiting the garden.

In accordance with the mission of UWBG, which can be summarized in the sentence - "About plants, with plants and for the plants" - we open our gates to young adepts of art, giving them freedom of expression and providing the necessary knowledge and materials. Thanks to them, we can reach with our message even further than before, in accordance with the message of the founder and first director of the University of Warsaw Botanic Garden - Michał Szubert.

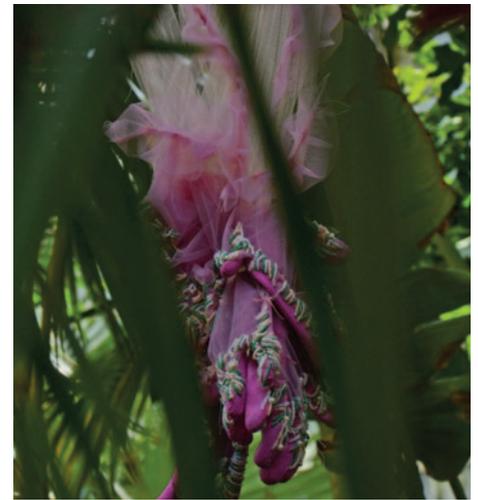
Thanks:

The authors would like to thank all the students of the Faculty of Design at the Academy of Fine Arts in Warsaw involved in the project and the substantive supervisors of the implemented works: Prof. Ksawery Piwocki, Dr. Jakub Marzoch, Dr. Magdalena Małczyńska-Umeda, Mgr. Jakub Jezierski, Prof. Wojciech Małolepszy, Dr. Robert Pludra, Dr. Paweł Jasiewicz, Dr. Bartłomiej Mejor, Dr. Magdalena Komar.

Author contributions:

Project concept: Marcin Zych; curating exhibitions and preparing the text of the article: Izabela Kuzyszyn; co-organization of exhibitions: Anna Albin, Marianna Darzynkiewicz-Wojcieszka; article proofreading: Anna Albin, Marcin Zych.

The work "Shells Vessels"; author: Paweł Jasiewicz. Exhibition "If a tree falls in the forest – and there is no one around to hear it", (UWBG 2022 Paweł Jasiewicz)



The project "Care – work – transformation", author Pola Wiślicz, Exhibition "Weaves. Between culture and nature" (Izabela Kuzyszyn, UWBG 2021)

REFERENCES

Hubeny-Żukowska, A., 2021. Akademia Sztuk Pięknych w Gdańsku, Ogród – miejsce spełnienia i schronienia artystów, artykuł przeglądowy, 2021 r., InAW Journal 57 Tom 2, nr 1,

Królikowski, J. T., Rykała, E., 2016. Kontemplacja krajobrazu jako źródło inspiracji twórczości artystycznej, Szkoła Główna Gospodarstwa Wiejskiego w Warszawie, Wydział Ogrodnictwa, Biotechnologii i Architektury Krajobrazu, Polska, Prace Komisji Krajobrazu Kulturowego, Nr 34/2016: 11-26.

A. Zavala, Inside Frida Kahlo's Garden: A deeper look at the iconic artist, <https://womenintheworld.com/2015/05/18/inside-frida-kahlos-garden-a-deeper-look-at-the-iconic-artist/>

AUTHOR

The University of Warsaw
Botanic Garden
Al. Ujazdowskie 4, 00-478 Warsaw
Mobile: 792 47 00 47

Author correspondence:
i.kuzyszyn@uw.edu.pl

A VIDEO-BASED ANALYSIS OF SCHOOL WORKSHOPS AT NEUCHÂTEL'S BOTANIC GARDEN



Hosting school classes at the Botanic Garden is an important part of an institution's educational mission and a common task for educators. How can they best be designed and delivered? Based on an analysis of video recordings of four workshops for 6-8 year old children, our research highlights three ideas for successful workshops...

Left: Cooking and tasting plants (Giuseppe Pocetti)

Below: Long-term collaboration with school: growing vegetables with allophone teenagers (Giuseppe Pocetti)

Why take a particular interest in school workshops, among the many educational activities offered by botanic gardens? Here are ten reasons to do so - and thus strengthen the collaboration between schools and botanic gardens in raising public awareness of the plant world and its conservation:

a) Botanic gardens offer many opportunities for much-needed plant education in the 21st Century.

1. Plant blindness in modern societies leads to a deficit in conservation efforts for the plant world: plants suffer from a lack of recognition, recall, interest and preference for animals (for a review see Blading & Williams 2016). This has been well-documented in literature under the name of plant blindness, or human inability to notice plants in one's everyday life (Wandersee and Schussler, 1999). This unfortunately results in conservation bias against plants. To overcome the zoocentric focus of conservation efforts, it is important to strengthen plant conservation and education - and botanic gardens are uniquely placed to do so (Heywood, 2017).





2. Young children struggle with the concept of plants being alive (Brulé et al. 2014). Plants must therefore be the focus of special awareness-raising and educational efforts.

3. Botanic gardens are, by design, biodiversity hotspots, offering a huge variety of species in a small space. These species are well-known and well-documented. They are cared for by dedicated teams of gardeners, conservators and passionate volunteers. All this represents a concentration of educational opportunities to meet, learn about and experience the botanical world.

4. Botanical gardens are urban or peri-urban places, accessible to an urban population disconnected from daily contact with nature.

b) School workshops offer opportunities to extend plant education to diverse audiences.

5. Thanks to the social diversity of the school, the school workshops reach a wide audience, especially children who might not otherwise have come to the garden with their families.

6. Emergent research (Joly & Poli 2014; Zwang & Zakhartchouk 2021) shows that the activities carried out during nature outings with schools can also have a positive impact on the child's family, which is encouraging. The workshops have a direct impact on the participating children and a possible indirect impact on their families.

c) Long-term partnerships between botanical gardens, teachers and schools are mutually beneficial.

7. Working with classes requires collaboration with teachers and schools. There are costs involved in establishing these links. However, it's well worth it if the collaboration is built up over the long term with a network of partner teachers and schools. The trust built up during previous workshops can be transferred to new classes of children and new educational programmes at the botanical gardens. There is an interesting cyclical dimension to working with schools: the children change every year and the classes may come back.

8. The workshop at the botanical garden can be part of a year-round programme in the classroom: it's no longer an isolated event, but forms part of a coherent programme, at the beginning, middle or end of a series of lessons, to which it also helps to give meaning through a concrete approach to plants.

Building homes for wild bees
(Giuseppe Pocetti)

*Botanic gardens are still “under-researched educational contexts.”
Sanders 2007*



The movements of wild bees capture the attention of school children (Marion Picard)

*“Despite plants comprising the majority of the federal endangered species list (57%), in 2011 they received less than 3.8% of federal endangered species expenditures”
Havens et al. 2014*



Touching soil (Marion Picard)

9. The long-term dimension is also interesting for longitudinal research: the children usually stay at the same school for several years and can therefore be followed. Different age groups can also be compared.

10. Going one step further, the workshops can be co-designed with motivated teachers. Inter-professional collaboration in the co-construction of educational proposals improves their relevance.

However, the success of these school workshops depends on the performance of experienced professionals or volunteers, in particular on their ability to interest children in the world of plants: this involves designing workshops that are attractive and instructive for both teachers and children, choosing themes and activities, managing time, combining the transmission of knowledge with an emotional and sensitive experience of plants, balancing the children's pleasure and freedom with control over time and the group. The activity of the educators is therefore in a state of tension between different objectives. The teacher's attitude, the pupils' mood, unforeseen circumstances such as the weather, the activities of other human and non-human living beings during the workshop, etc., all contribute to its success. Will we find the bees sleeping in the flowers? Can we hear the worm in the soil, or smell the fragrance of elderflower? The educators lead the school workshops with great capacity to adapt to the unexpected, while keeping firmly in mind the common thread of the workshop. This requires sophisticated skills and professional gestures. In our research, we identified some effective professional gestures during school workshops, using a methodology based on the analysis of video-recordings of four 2-hour school workshops with 6-8 years old children (two workshops on seeds and the life cycle of plants, one on wild bees, one to discover the forest through the senses).

We identify three critical dimensions of children's connections with plants during school workshops.

(a) Multi-sensoriality: touching, smelling, tasting, listening to nature

"Close your eyes, I'll put a seed in your hand, you can taste it and try to guess what it is..." "You can put your hand in the bag, touch it and guess what vegetable it is... But for now, keep it a secret, we'll talk about it later!" In the school workshops, the children are invited to combine a cognitive and playful activity (identifying, guessing) with a sensory activity (touching, tasting), all within a social framework: everyone experiments, then we discuss it all together. By limiting the use of sight, the information conveyed by the other senses becomes more salient and sometimes makes it possible to establish a different relationship with nature.

REFERENCES

Balding, M. & Williams, K.J.H. 2016. Plant blindness and the implications for plant conservation. *Conservation biology* 30(6), 1192-1199.

Brulé, L., Labrell, F., Megalaki, O., Fouquet, N. & Caillies, S. 2014. Children's justifications of plants as living things between 5 and 7 years of age. *European Journal of Developmental Psychology*, 11(5), 532-545.

Havens, K., Kramer, A. T., & Guerrant Jr, E. O. 2014. Getting plant conservation right (or not): the case of the United States. *International Journal of Plant Sciences*, 175(1), 3-10.

Heywood, V. H. 2017. The future of plant conservation and the role of botanic gardens. *Plant Diversity*, 39(6), 309.

"Before we plant the seeds, you'll be the seeds, and we'll understand the plant cycle..."



Acting as a plant (Stefan Walter)



Sensory approaches are being developed in botanical gardens for all kinds of audiences, and our research shows that they also work very well with children in school workshops, bringing their attention to living beings that they might not have been interested in based on their appearance.

(b) Embodied imitation: acting “as if” to promote interest, understanding and empathy

“Before we plant the seeds, you’ll be the seeds, and we’ll understand the plant cycle... At the beginning we are just little seeds in the ground, it’s the end of winter, it’s cold and we are well protected in our soil... We have a shell that protects us, and inside we have plenty of food reserves for the next plant that grows...”. By imitating the movements of the mediator, who physically re-enacts the cycle of the plant emerging from the earth, by presenting their leaves to the sun and their flowers to the pollinators, by bearing fruit containing seeds, the children experience with their own bodies the connection between the seed, the plant and the fruit, and gain a better understanding of the explanations given earlier.

(c) Anthropomorphism as a resource for learning and connecting to nature

“But when the bee is born, it will be alone, without its mother?” In this didactic situation, two little girls listen attentively to the mediator’s explanations on the life cycle of the wild bee, worried and perplexed by this “orphaned baby bee”. Anthropomorphism can be an obstacle to science education, but it can also open up a discussion, bridge worlds, change children’s perspectives and make them realise how different the life cycle of wild bees is from their own.

Further analysis will undoubtedly reveal other aspects of these workshops, which the educators combine brilliantly with their intention to build up the children’s knowledge, in order to achieve a dual objective: to improve the children’s knowledge of plants, while at the same time allowing them to marvel at the plant kingdom, to develop their interest in plants and to experience the pleasure of meeting them.

Free exploration searching for wild bees
(Marion Picard)

REFERENCES CONTD

Joly, A. & Poli, M. S. 2014. Découvrir en famille les œuvres de Pierre Soulages après une visite scolaire. *Muséologies*, 7(1), 123-139.

Sanders, D. L. 2007. Making public the private life of plants: The contribution of informal learning environments. *International journal of science education*, 29(10), 1209-1228.

Wandersee, J. H. & Schussler, E. E. 1999. Preventing plant blindness. *The American biology teacher*, 61(2), 82-86.

Zwang, A. & Zakhartchouk, J. M. 2021. Apprendre dehors. *Les Cahiers Pédagogiques*.



Creative part of our spring school workshop on seeds (Giuseppe Pocetti)

AUTHORS

Institute of Psychology and Education, University of Neuchâtel, Switzerland

Laure Kloetzer
laure.kloetzer@unine.ch
Marion Picard
marion.picard@unine.ch

Botanical Garden of Neuchâtel, Switzerland

Léa Wobmann
lea.wobmann@ne.ch
Blaise Mulhauser
blaise.mulhauser@ne.ch

WITH NATURE THERAPIES THE BOGOTA'S BOTANIC GARDEN LEADS THE WAY IN RECONNECTING WITH OUR NATURAL WORLD



When we slowly walk through a natural area, in a mindful way, energizing our senses, and allowing our mind and body to tune in to the rhythm of the more-than-human world, we remember that we are nature. We connect with the network of life that supports and nourishes us, while bringing calm, well-being, hope and vigour to our lives. That is what the Bogotá Botanical Garden seeks with its recent Nature, Health and Culture Programme where, through Nature Therapies, it offers spaces to develop nature reconnections, while highlighting the therapeutic potential of this vital encounter. This is part of a conservation education strategy, with a two-way vision: nature health= human health.

Feeling one again with nature, more than a philosophical approach, is a need that we have as a modern society. Global warming, loss of species, destruction of habitats and ecosystems, the increase of chronic and mental illnesses, all could be the consequence of the Nature Deficit (Louv, 2008) that we, as contemporaries, unconsciously suffer.

At the Bogotá Botanical Garden, we believe that nature reconnection is of vital importance if we want not only to bring well-being to our lives and improve our health but also the health of ecosystems and the balance of their interactions.

**JARDÍN BOTÁNICO
DE BOGOTÁ**

Above: Participant in a nature therapy session at the BBG (Bogota Botanic Garden)



That is why in 2020, inspired by a global movement that called us to return to nature, we created the Nature, Health, and Culture Institutional Programme, setting the goal of reconnecting people with nature and promoting sensory environmental practices that contribute to the creation of a culture of care and good living and aiming to promote the conservation of ecosystems as well as the preservation of the well-being of citizens.

But how can we facilitate that reconnection?

Most of the botanical gardens in the world are experts in conservation education in unconventional spaces, and we have made invaluable contributions to the construction of environmental awareness from scientific knowledge and pedagogical practices, but in Bogotá we felt that it was necessary to promote the vital reconnection with nature and thus strengthen the processes of social appropriation for the care and conservation of the natural environment.

Talking about connection means establishing a union between the two. This, in turn, leads us to deal with the relational aspect, making it evident that we must first foster more reciprocal relationships with nature.

The hectic modern and highly techno-dependent urban way of life has led us not only to a physical separation from natural environments but to an emotional distancing from what we evolve and are a part of. Maybe we stay so busy in part, so we don't feel the pain of this separation?

Bearing this in mind, we knew that our first objective had to be to create spaces that allow nature encounters and that would help us mend our broken relationships. Environmental education spaces strengthened from other approaches, where “being” and “feeling” are fundamental.

With this, we would allow our visitors to relate to other natural beings no longer from a rational or intellectual perspective but from a sensory and emotional perspective, making it easier for them to generate bonds and thus allowing them to fuel their innate love for nature (Biophilia). After all, we hardly fall in love with someone by exclusively reading their biography or without generating a relationship with that person.

Inclusive nature therapy session at the BBG (Bogota Botanic Garden)

When we walk slowly in a natural environment and focus our senses on each of the many ways in which the living forest surrounds and caresses us, we lower the volume of the mental noise caused by our thoughts.



Participant in a nature therapy session at the BBG (Bogota Botanic Garden)

Biophilia refers to our innate connection with the living. It is a concept that explains the vital union of the human being with nature in an ancestral and evolutionary way (Wilson 1984). In fact, all species depend on their interaction with the environment that surrounds them, and as human beings, our original environment is nature, since we have spent 99.9% of our evolutionary time living in natural environments.

In the review of international experiences, we find in the practice of Forest Bathing or “Shinrin Yoku” (Miyazaki, 2018) and its Western relational version of Forest Therapies (ANFT Model - Clifford 2018), part of the intervention strategy to follow.

Forest Bathing, which originated in Japanese culture, is a peaceful practice that takes us to nature and its enormous healing potential. Although it is possible to enjoy forest bathing for recreational purposes, the conscious practice of Shinrin Yoku, fully experienced through the five senses, has an amazing beneficial effect on our physical, emotional, and mental health.

When we walk slowly in a natural environment and focus our senses on each of the many ways in which the living forest surrounds and caresses us, we lower the volume of the mental noise caused by our thoughts. The senses place us in the present moment, in which we can absorb everything that the forest offers us, we settle down and feel welcomed. When we let nature take its place within us, the body's natural ability to generate health and well-being is immediately stimulated; something that in recent decades has been extensively documented.

For example, Dr. Qing Li, an immunologist at the Nippon Medical School in Tokyo, has demonstrated the healing power of nature to reduce stress and increase the immune system. He emphasizes the “importance of sharpening our five senses when we are in the forests and promotes forest medicine as a way of preventing diseases and preserving our health (Li, 2018).”

There is nothing like nature to reconnect with ourselves and feel the whole of who we are. Nothing more valuable than recovering love for Mother Earth when carrying out environmental education and conservation programmes. When our life moves away from natural cycles, our life force decreases. Fortunately, the antidote is as close to us as the natural space closest to our home or workplace.

This is how we have integrated the dimension of health and well-being in the commitment to construct a new way of relating with nature. We added Nature Therapies* to the Garden's service portfolio, as reconnection encounters with the natural world, and as an innovative way to advance our mission of conservation of flora and ecosystems, with a specific vision: The health of ecosystems is equal to human health; That is to say, it is a two-way relationship; Through these therapies we can rebuild and heal our broken relationships with Mother Nature, and thus begin the construction of a regenerative culture.

“And don't forget that the earth delights in feeling your bare feet and that the winds long to play with your hair.” Kahlil Gibran

REFERENCES

- Louv, R. 2008. Last child in the woods. Saving our children from Nature-Deficit disorder. Workman Publishing Company, Inc. New York, USA.
- Wilson, E. 1984. Biophilia, the human bond with other species. Harvard University Press, USA.
- Miyazaki, Y. 2018. The Japanese art of Shinrin Yoku. Timber Press. Oregon, USA.
- Clifford, A. 2018. Your guide to forest bathing. Experience the healing power of nature. Conari Press. Canada.
- Li, Qing Ph.D. 2018. Forest Bathing. How trees can help you find health and happiness. Penguin Random House, LLC. New York, USA.



Nature Therapy guides, BBG 2023
(Bogota Botanic Garden)

AUTHORS

Martha Liliana Perdomo R.
General Manager -
Bogota Botanic Garden
mperdomo@jbb.gov.co
perdomo.martha@gmail.com

Paola Liliana Rodríguez S.
Nature and Health Coordinator -
Bogota Botanic Garden
Paola.rodriguez@jbb.gov.co
Paolalsilva06@gmail.com

THE ANDROMEDA ETHNOBOTANICAL GARDEN



The Andromeda Ethnobotanical Garden aims to reflect an important part of Barbadian culture and is a Celebration of Local – people, plants and wildlife. The hope is that people will recognise the connections we all have with plants and the wider environment. This article discusses the creation of the space.

The Andromeda Ethnobotanical Garden opened in December 2022, having been a seed in the mind of the curator of the wider Andromeda Botanic Gardens for over a decade. She felt there needed to be much more of a connection between the garden and the local population. While the garden was undoubtedly beautiful, there was no real information about how local Barbadians used plants and no real overt signs of the importance of the conservation of local plant species – the latter vital for the status of ‘botanic’ garden. The former is necessary to ensure the garden is relevant to its community, something lacking in tourism-focussed Barbados, where many aspects of heritage are lost in the pursuit of catering for overseas visitors. But let’s show Barbados! We believe that keeping and showcasing heritage is beneficial to tourism and provides a unique sense of space for both educating and entertaining all visitors. Funding was provided by Sandals Foundation, a Jamaican organisation that recognised the community and sustainability foci of the project, and the Garden was a collaboration with a local non-profit organization, Biocultural Education and Research Programme.



Above: University students propagating (Sharon Cooke Passiflora Ltd)
Top: Ethnobotany workshop (Sharon Cooke Passiflora Ltd)



View across the Bachelors Buttons plants, towards the Atlantic Ocean
(Sharon Cooke, Passiflora Ltd)

The garden is relevant to its community, a Celebration of Local – people, plants and wildlife.

The Andromeda Ethnobotanical Garden is a Celebration of Local – local people, plants and wildlife. It is a community garden in the widest sense of the word. It aims to educate all visitors about ancestral, current and future uses of plants in Barbados, as well as to showcase conservation in action. One of our roles as a botanic garden is to educate. Our interactive Ethnobotany Workshops, created by Dr Sonia Peter from BERP, take place within the new Ethnobotanical Garden and are a great way to demystify the term 'Ethnobotany'.

While we have a range of other courses and workshops, a vital way to educate can be to just raise awareness. The whole of Andromeda is organic. By creating the Ethnobotanical Garden as another safe environment, dedicated to our use of plants, surrounded by wildlife, we will show how close we are to the natural world albeit within a woman-designed environment. This will hopefully encourage others to learn more about how their ancestors used plants, wherever they are from. It might encourage a revival in such practices. Importantly, it might encourage everybody to acknowledge the wider environment as a shared space, and to protect this world.

So, the process in a nutshell. The area was about two acres of overgrown 'bush'. This was selectively cleared with the removal of invasive trees and the transplanting of herbaceous plants to other parts of Andromeda. Students from the University of the West Indies helped immensely, both with clearance, setting out the new beds and the propagation of plants.

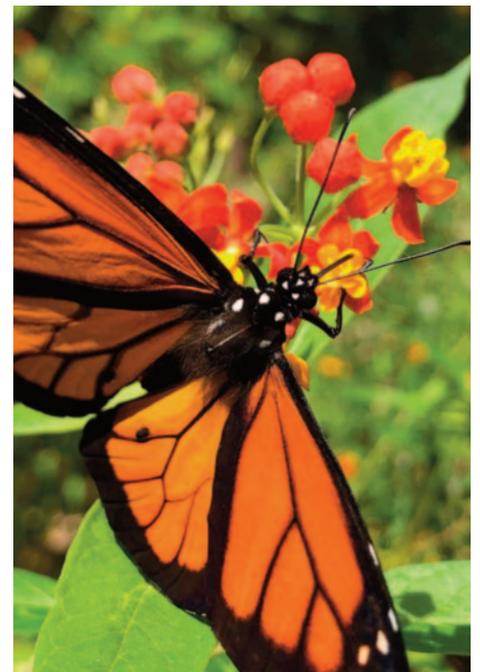
For the new planting, the emphases were on selecting trees and shrubs that were native to the region (tropical America) and which had ethnobotanical uses; planting herbaceous species (native and exotic) with long histories of such uses; and choosing annuals (preferably native) that were nectar-rich to provide food sources for birds and insects.

Some species are particularly special for both people and wildlife. For example, milkweed plants (*Asclepias curassavica*) have historical ethnobotanical uses (ringworm, sores, dermatitis) as well as wildlife use - monarch butterflies lay their eggs on milkweed plants only. So here we have milkweed, used by our ancestors, which will also attract comparatively rare monarch butterflies! How serendipitous is that! Many local people hadn't seen them in years.

To encourage all butterflies to stay within the Ethnobotanical Garden, and thus enable even more people to experience the majestic spectacle of the monarchs, *Zinnia* cvs, *Gomphrena* cvs, *Celosia* cvs, and other nectar-rich annuals have been planted.



Nectar-rich annuals
(Sharon Cooke, Passiflora Ltd)



Monarch butterfly on milkweed
(Shane Hackett, Passiflora Ltd)



Head gardener Troy setting out some medicinal plants in The Ground (Sharon Cooke, Passiflora Ltd)

REFERENCE

Handler, J & Jacoby, J 1993. A Review of the Ethnopharmacology as Practiced During the Period of Slavery on the Island of Barbados, Journal of the BMHS, vol 41.

AUTHOR

Sharon Cooke
 Andromeda Botanic Gardens
 +1246 248 0190
 sharon@andromedabarbados.com

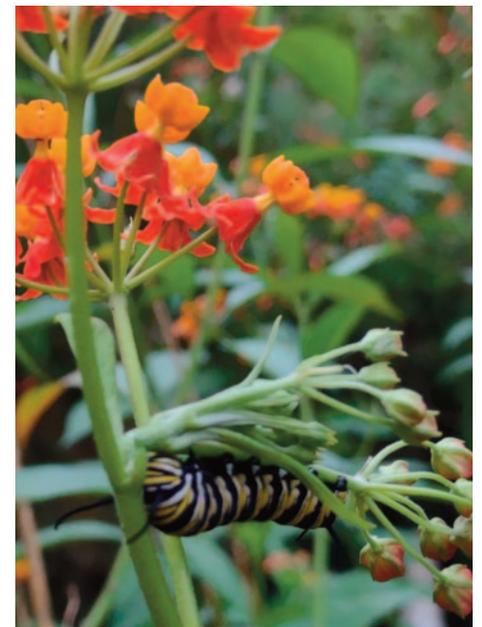
Regional plants such as cannas (*Canna indica*), passion fruit vines (*Passiflora edulis*), paw paw trees (*Carica papaya*), members of the Solanaceae family and Christmas candles (*Senna alata*) started appearing very quickly in large numbers, like magic! Alright it wasn't exactly magic. The clearance of the previously impenetrable site simply allowed favourable conditions for the dormant seeds to germinate. It seemed magical! As well as having ethnobotanical uses, many of these are key host plants for other butterflies such as canna skippers, gulf fritillaries and sulphurs. It seemed as if the new garden was designing itself. Some plants we left in situ. Others were transplanted to other places within the Ethnobotanical Garden.

It must be noted that ethnobotany refers to the use of plants by people. It is much broader than medicinal use. Our series of interpretive signs illustrate various uses. Ras IIs uses the leaves of pop-a-gun (*Cecropia* sp) as a shampoo; children use the flowers from the Frangipani tree (*Plumeria* sp) to make rings; Leibert, when he was a baby, was given a drink made from the leaves of the pride of Barbados plant (*Caesalpinia pulcherrima*).

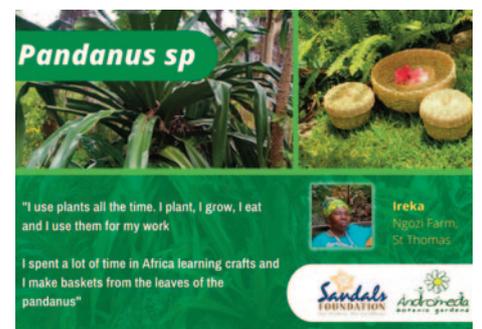
But the medicinal uses are hugely important as plants helped the enslaved people to survive - physically and culturally. We celebrate the 60 documented medicinal species (Handler, J & Jacoby, J (1993) 'A Review of the Ethnopharmacology as Practiced During the Period of Slavery on the Island of Barbados', Journal of the BMHS, vol 41.) used during enslavement with The Ground, an even newer area within the Ethnobotanical Garden. A place of beauty, rest and contemplation with a small intimate deck overlooking the Atlantic Ocean, this space is due to be completed by the end of 2023. This was another international effort with students from McGill University Canada helping Head gardener Troy with weeding, the planting design, propagating and planting plantains!

We believe we have created something special in the glorious space at Andromeda Botanic Gardens. Yes, we wanted to create a living laboratory for academics, but we also wanted to create a resource where ordinary people can take the plants and use them – yes, take them. We want people to talk about the plants and how they are used. Once that conversation starts, they might look back. They might return to their ancestors 'my grandfather used to send me to the ground to get...' and by having that conversation, they honour them. By encouraging the use of plants, we honour them. By educating others, we honour our ancestors. By concentrating on local plants, we are trying to create something specific to our region, conserving local plants and providing a haven for local wildlife.

Will our garden help visitors reconnect with nature? Will they think about their own cultures? Will they recognise the importance of protecting and enhancing their own local biodiversity for the benefit of people and wildlife? We can hope. All we can do is present our new garden in an honest, practical and accessible way and hope people react positively and think about their relationships with plants and the wider environment. The Andromeda Ethnobotanical Garden truly is a Celebration of Local and, perhaps, a Garden of Hope.



Milkweed with monarch caterpillar (Sharon Cooke, Passiflora Ltd)

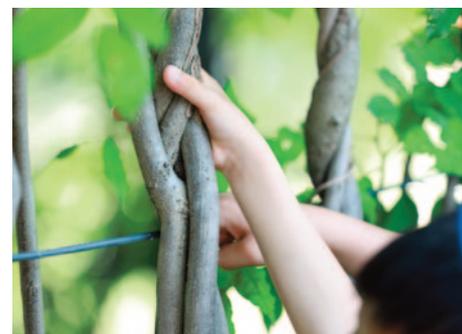


One of a series of interpretive signs (Sharon Cooke, Passiflora Ltd)

RETURNING EDUCATION TO NATURE – TAKING THE “LITTLE BOTANIST” SERIES OF COURSES AS AN EXAMPLE

As is well known, plants play an important role in the survival and development of all organisms, including humans. However, people's attention to plants is still very low, and the phenomenon of "plant blindness" is widespread. How to establish connection between humans and nature to overcome the phenomenon of "plant blindness" has become an urgent problem to be solved. Shanghai Chenshan Botanical Garden has launched a series of nature education activities. This article takes the "Little Botanist" series of courses as an example (including a three level version of a series of courses, see below) aiming to guide teenagers to approach nature. Through observation, exploration, discussion, and thinking in nature, they can gradually enhance their understanding and attention to nature, and establish emotional connections with nature.

Traditional science popularization activities are often single events and have limited impact on students. Based on this, Shanghai Chenshan Botanical Garden has planned a series of courses for the “Little Botanist” training camp, aiming to cultivate students' ability to observe, think independently, and put this into practice, just like a scientist. The course consists of a three level (1.0 version, 2.0 version, 3.0 version) series of courses. The 1.0 version includes four themed courses: “Diverse Leaves”, “Useful Stem”, “Secret of Flowers”, and “Travel of Seeds”; The 2.0 version includes four themed courses: “Exploring Cells”, “Plant Naming”, “Endangered Plants”, and “Web of Life”; The 3.0 version includes six courses with a dual carbon theme: “Calculating Life Carbon Footprint”, “Simulating Carbon Trading”, “Carbon Emission Behaviour Survey”, “Plant Carbon Sink Survey”, “Dual Carbon Theme Promotion Design”, and “Scientific Communication Practice”. Students are promoted from 1.0 version classes to 2.0 version classes, and then to 3.0 version classes. The step-by-step approach enables students to have a deeper, systematic, and comprehensive understanding of nature and pay attention to the entire ecosystem.



Above: Exploring the morphology of stems (Chen Tao)
Top: Promoting low-carbon concepts (Chen Tao)



About our courses

The 1.0 version of the “Little Botanist” training camp is based on an exploratory scientific teaching method and asks children, “Are there two identical leaves in the world?” “How do botanists classify plants based on their morphology?” “What are the uses of plant stems in human life?” “What are the secrets hidden in flowers?” “Why do flowers have such rich colours?” “How do plants reproduce?” “What are the secrets hidden in seeds?”. These and other questions, guide children to observe and think about plants in the unique natural environment of the botanical garden. A study form is used to guide children to complete corresponding exploration tasks.

The 2.0 version of the “Little Botanist” training camp has set up four courses: “Exploring Cells”, “Plant Naming”, “Endangered Paths”, and “Web of Life”. The design concept is to transition from the micro natural world to the macro natural world, from individuals to groups, and then to the entire ecosystem. Through progressive learning, students are able to observe nature, understand nature, and understand its operation mode from different perspectives. A more systematic understanding of life, understanding the relationships between various factors in all ecosystems, and thus being able to measure one's own behaviour within a larger system. The courses guide students to use systematic thinking through of tasks to understand the connections between individuals and the entire system, and focus on their own actions.

The 3.0 version of the “Little Botanist” Training Camp is a citizen science project focused on carbon footprint research, which includes six courses: “Calculating Life Carbon Footprint”, “Simulating Carbon Trading”, “Carbon Emission Behaviour Survey”, “Plant Carbon Sink Survey”, “Dual Carbon Theme Promotion Design”, and “Scientific Communication Practice”. The course involves knowledge of citizen scientists, carbon footprints, carbon trading, carbon neutrality, carbon peaking, and carbon sinks, etc. Through learning and recording carbon emissions in daily life, simulating carbon trading games, questionnaire surveys, plant carbon sink surveys, and other scientific practices, participants are encouraged to practice citizen scientific research. This activity aims to cultivate students’ scientific literacy, teach scientific investigation methods, and study carbon emissions and emission reduction behaviours in their daily lives through six courses.

Curriculum planning ideas and characteristics

1. This advanced series of courses breaks through the traditional form of single science popularization activities, and the step-by-step approach enables students to have a deeper, systematic, and comprehensive understanding of nature which considers the entire ecosystem.

Plant carbon sink survey (Chen Tao)



Poster of the 1.0 version



Poster of the 2.0 version (left) and 3.0 version (right)



Game of leaves (Chen Tao)



2. The course design and practice are based on constructivist learning theory and the theory of multiple intelligences. This emphasizes students' active thinking in the learning process, connecting with reality and experience, constructing their own learning system, and advocating exploratory learning and cooperative learning based on the real situation teaching in the botanical garden.

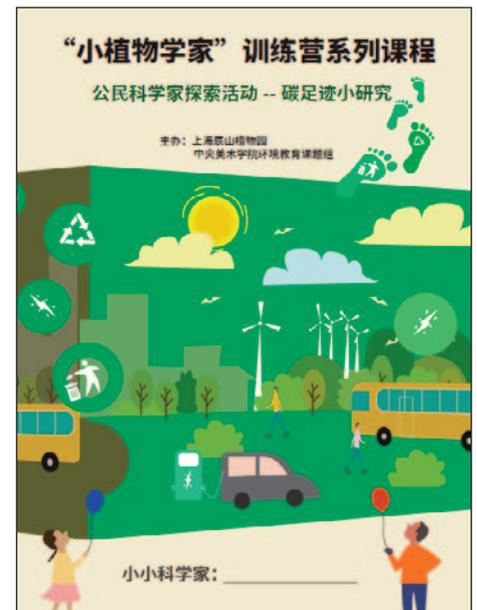
3. Diversifying in organizational form. In terms of basic knowledge content, teachers lead the learning, facing all students, guiding them to learn and promoting teaching and learning mutually; paying attention to the subject status of students, giving them full autonomy through group exploration, mobilizing their learning enthusiasm, and unleashing their learning initiative. Each group is paired with a volunteer teaching assistant, who guides and helps individual students in a timely manner during the activity, paying attention to each learner.

4. The diversification of curriculum forms enhances the development of students' diverse abilities. Based on the curriculum standards, teaching knowledge and concepts related to life science modules; Integrating the scientific thinking approach of observation, hypothesis, verification, evaluation throughout the learning process to develop students' learning and transfer abilities; Increasing outdoor activities, combine games and exploration, strengthening team building, and increasing sports opportunities; More emphasis is placed on teamwork, and the environment to achieve a socialized learning scenario of "others are teachers", breaking the traditional learning perspective and gaining a more comprehensive and diverse understanding of the world. In group division of labour, each person has their own role, and the concept of "everyone is an important component of the team" is promoted. Respecting each person, leveraging their strengths, and fully tapping into individual initiative.

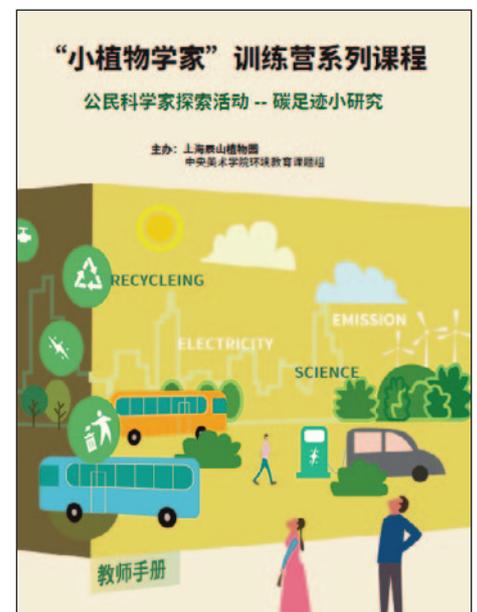
This project has attracted the attention of many university experts and facilitated cooperation and communication with Zhejiang University, Central Academy of Fine Arts, and Shanghai Jiao Tong University. Together, we conducted a scientific evaluation of the entire course. A questionnaire survey was conducted before and after the course to verify the effectiveness of our courses in enhancing students' attitudes, cognition, and natural connection towards plants. After empirical analysis of the data, we found students' attitudes, cognition, and sense of natural connection towards plants were significantly improved after participating in the course. In addition, we also conducted post class interviews with some students to understand the changes in participants' behaviour, emotions, and attitudes towards nature after the course. Through the above evaluation work, we can comprehensively understand the problems and effects of course project implementation, thereby providing a strong basis for project improvement and further promotion.

Creating posters to analyze the causes of endangerment (Chen Tao)

The step-by-step approach enables students to have a deeper, systematic, and comprehensive understanding of nature.



Student's handbook



Teacher's handbook

AUTHOR

Wang Fengying
Shanghai Chenshan Botanical
Garden

THE ROLES OF BOTANIC GARDENS IN CONNECTING VISITORS WITH NATURE



The role of botanic gardens in connecting visitors with nature depend on the use of approaches which recognize the needs of each life stage. Introducing nature to all ages through the wonders of discovery and development of skills, confidence and a sense of self, creates bonds and memories, building upon personal and community wellbeing.

As young people mature into the pre-teen and teenage years, learning about the natural world helps them build confidence and a sense of self.



Connecting people with nature is a mission common to many botanic gardens that strive to be inspirational and to create aesthetic experiences in natural settings and growing appreciation for the environment. Just as most of us are increasingly growing more inactive, glued to screens in homes and offices, there is mounting evidence that illustrates the value of spending time in nature. The American Psychological Association has summarized various benefits individuals derive from nature breaks, including improved cognitive performance and mental health, greater happiness and sense of well-being, and stronger social connectedness (Weir 2020). Botanic gardens can promote their spaces as ones where visitors can reconnect with nature and enjoy many of these benefits. Some gardens are responding to this need by partnering with corporate entities for mindfulness retreats, physician groups for park prescriptions, and psychologists for treating patients with less severe health challenges (Wolf 2016).

Above: Strolls for Well-Being Guide at Bloedel Reserve (Bloedel Reserve)
Top: Camp participants with snake at Cape Fear Botanical Garden (Cape Fear Botanical Garden)



In taking lessons from the vast diversity of nature, programs that are most successful are customized to the varying needs of different age cohorts. We know that children learn best when introduced to nature in self-guided, fun ways that support self-development. This is the approach being taken by the Chicago Botanic Garden in their 'Nature Play Garden.' The plants in this garden were selected for qualities such as color, scent, texture, and even sound, encouraging young people to use all their senses as they explore the rolling hills and planted beds.

The Bernheim Arboretum and Research Forest is redefining the concept of a playground with their Playcosystem, "designed in harmony with nature to provide children with open-ended, physically challenging, and unstructured play opportunities that support healthy development." They hope to share with other botanic gardens, schools, and parks what they learn in observing children at play.

As young people mature into the pre-teen and teenage years, learning about the natural world helps them build confidence and a sense of self. But to effectively engage this challenging demographic, youth must be offered opportunities to shape and build their programs. That's the approach taken at 'Grow Wild' at the Royal Botanic Garden Kew. Teens apply for small grants to deliver a creative or community space project, and a panel of young people select the projects to be funded. All projects are built around using or celebrating native wildflowers. The Fairchild Challenge, run by Fairchild Tropical Botanical Garden, similarly engages young people of diverse interests and backgrounds to explore the natural world.ⁱ

In the adult years, individuals are increasingly squeezed by work, family, and other commitments. To appeal to limited leisure time, adult nature-based programs at botanic gardens will focus on self-improvement or the acquiring of new knowledge. The 'Natural Areas Conservation Training Program' (N-ACT) at the Morton Arboretum provides participants with classroom training in plant identification, plant ecology, and invasive species management. Certified N-ACT volunteers then apply their new skills to restore natural areas, including woodlands, prairies, and wetlands.ⁱⁱ The Native Plant Trust takes this concept to a deeper level, offering both beginner and advanced certification programs in which enrollees learn to identify, cultivate, and conserve native New England plants while gaining a greater appreciation for their ecological importance. While participating in the program, students are expected to actively engage in efforts to preserve and restore native New England plants.ⁱⁱⁱ

Bare Trees and Shrubs class in the Native Plant Trust Certification Program (Native Plant Trust)



Yoga on the lawn Longhouse Reserve (Longhouse Reserve)

The American Psychological Association has summarized various benefits individuals derive from nature breaks, including improved cognitive performance and mental health, greater happiness and sense of well-being, and stronger social connectedness.
Weir, Kristen



Young children explore The Nature Play Garden at Chicago Botanic Garden (Chicago Botanic Garden)

Engagement with nature also includes creating shared spaces for people to connect through intergenerational and multicultural garden experiences.

Since stress, anxiety, and other mental health issues are so prevalent today, many botanic gardens have adopted adult programs that focus on well-being in natural settings. LongHouse Reserve, on the eastern end of Long Island, regularly offers tai chi, yoga, and forest bathing classes to those who aim to de-stress while reconnecting with nature. At the Bloedel Reserve on Bainbridge Island, Washington, connecting with nature is central to their mission. 'Strolls for Wellbeing' is a complimentary seasonal program offered that supports connection with nature through a series of 12 self-guided walks. New participants receive a guidebook with instructions and inspiration for 12 distinct mindfulness-based walks throughout the Reserve.

Engagement with nature also includes creating shared spaces for people to connect through intergenerational and multicultural garden experiences. Life-long learning, seasonal events and gatherings in botanic gardens offer unique settings for such bonding. Cape Fear Botanical Garden programs include a range of celebrations, such as Family Art Night and Pondamania, that engage visitors of all ages in making connections between art with nature. BOO-tanical and Holiday Lights are celebrations geared towards the community at large, resulting in the greatest diversity in participation. These socially-oriented events can be one's initial exposure to a garden leading to the creation of wonderful memories and return visits.

The wonders of discovery and learning are available in each stage of life. Gardens with a welcoming-to-all approach build upon a mutually respectful relationship with guests. Creating a variety of opportunities for those "aha" moments in nature is of infinite value in enhancing a sense of purpose in our daily lives. Witnessing them provides staff and volunteers joy in giving back to others. The growing fields of environmental psychology and therapeutic landscapes champion engagement with natural and garden settings to improve individual and community well-being. By developing a variety of such spaces and experiences for guests, botanic gardens are uniquely positioned to provide visitors with the means to learn more about themselves while connecting with nature and each other.

ⁱ Fairchild Tropical Botanical Garden- Fairchild Challenge <https://fairchildgarden.org/science-and-education/learn/the-fairchild-challenge/>

ⁱⁱ Morton Arboretum – Natural Areas Conservation Training <https://mortonarb.org/explore/learning-opportunities/natural-areas-conservation-training-n-act-program/>

ⁱⁱⁱ <https://www.nativeplanttrust.org/education/certificate-programs/>



Families gather at Cape Fear Botanical Garden (Cape Fear Botanical Garden)

Since stress, anxiety, and other mental health issues are so prevalent today, many botanic gardens have adopted adult programs that focus on well-being in natural settings.

REFERENCES

Weir, K. 2020. Nurtured by nature. *Monitor on Psychology*. 51(3).

Wolf, K. L. 2016. Nature: Life's Best Medicine. *Public Garden Magazine*. 31(2).

AUTHOR

Donald A. Rakow Associate Professor, retired
Section of Horticulture, School of Integrative Plant Science
Cornell University
dr14@cornell.edu

Christopher B. Hoffman, CEO
Cape Fear Botanical Garden
choffman@capefearbg.org

Enjoying unstructured play at the Playcosystem at Bernheim Arboretum and Research Forest (Bernheim Arboretum and Research Forest)

RESOURCES

1. The Nature Connection Handbook – University of Derby

This handbook, produced by The University of Derby, is designed to be used by a wide range of organisations and individuals who have an interest in helping people grow closer to nature and offers an accessible summary of nature connection research and application, a framework and guidance for helping people improve their connection with nature, and examples of activities and initiatives that support and develop nature connection.

<http://bit.ly/NatureConnectionHandbook>

2. How to connect with nature in cities a forest bathing approach - Victoria Reynal

This toolkit is inspired by #NatureForAll, a global movement of individuals and organisations who share a similar conviction: the more people experience and share their love of nature, the more support and action there will be for its conservation.

<https://natureforall.global/wp-content/uploads/2021/08/Forest-Bathing-Final-compressed.pdf>

3. Green social prescribing toolkit – NHS

This toolkit is specifically about the learning that has arisen from the targeted Green Social Prescribing programme to tackle and prevent mental ill-health. The purpose of the toolkit is to offer a 'how to' guide for those people who have responsibility for, or a role in, starting, developing, or growing green social prescribing schemes.

<https://socialprescribingacademy.org.uk/what-is-social-prescribing/natural-environment-and-social-prescribing/green-toolkit/>

4. Last Child in the Woods: saving our children from nature-deficit disorder – Richard Louv

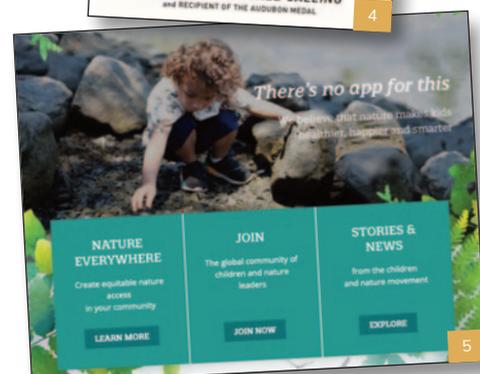
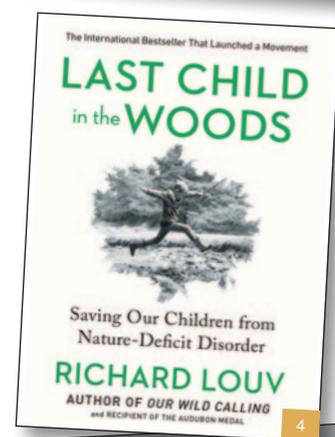
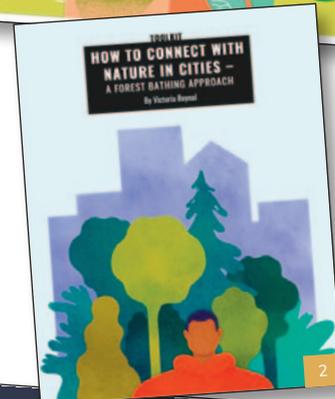
In this influential work about the staggering divide between children and the outdoors, child advocacy expert Richard Louv directly links the lack of nature in the lives of today's wired generation—he calls it nature-deficit—to some of the most disturbing childhood trends, such as the rises in obesity, attention disorders, and depression. Last Child in the Woods is the first book to bring together a new and growing body of research indicating that direct exposure to nature is essential for healthy childhood development and for the physical and emotional health of children and adults.

<https://richardlouv.com/books/last-child/>

5. Children and nature network

Following the publication of "Last Child in the Woods," the Children & Nature Network was created to encourage and support the people and organizations working to reconnect children with nature. The network supports and mobilizes leaders, educators, activists, practitioners and parents working to turn the trend of an indoor childhood back out to the benefits of nature—and to increase safe and equitable access to the natural world for all.

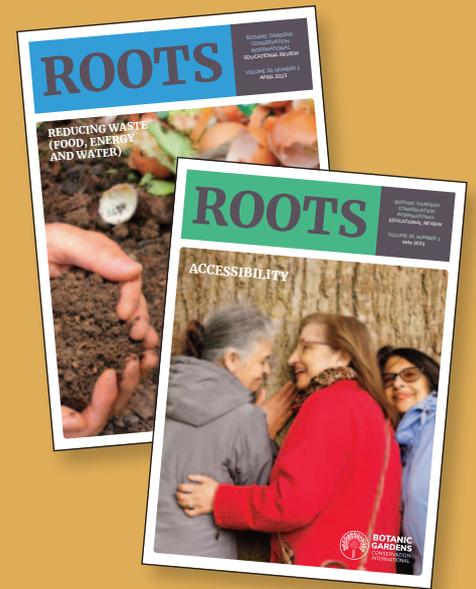
<https://www.childrenandnature.org/>



CONTRIBUTE TO THE NEXT ISSUE OF ROOTS

The next issue of *Roots* will focus on conservation prioritisation and how we can engage our visitors with this important topic. In 2024 BGCI will have completed a ground breaking piece of work to assess the world's tree – the Global Tree Assessment. This is a global effort with hundreds of partners contributing to this work and being supported by BGCI. But what are we doing with this information? Is there an opportunity to engage our visitors with this important area of our work and if so how do we go about it? We are looking for a range of examples that bridge the gap between the conservation assessment work taken place to understand the status of the world's plant species, and the stories that we tell our visitors. This could include interpretation examples, lesson plans, focused booklets, science communication talks, and much more.

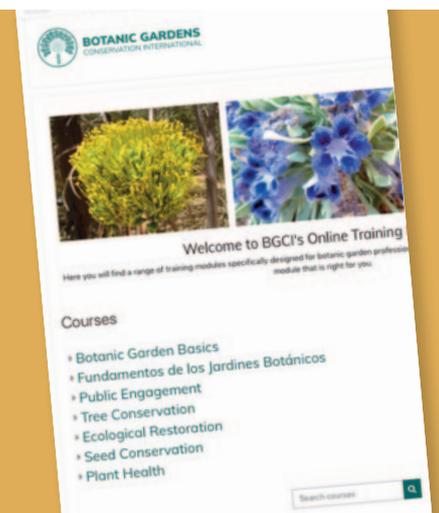
To contribute, please send a 100 word abstract to ane.zabaleta@bgci.org by 15th January 2024.



BGCI'S ONLINE TRAINING PLATFORM

BGCI's online training provides online training courses for BGCI members and other interested individuals. The platform, allows the creation of a range of interactive content with resources designed to complement BGCI's existing face-to-face training courses, projects and publications. Current courses include an Introduction to Interpretation, an Introduction to Evaluation and an Introduction to Science Communication, as well as a suite of foundation courses for botanic garden management called Botanic Garden Basics.

Visit: <https://training.bgci.org>

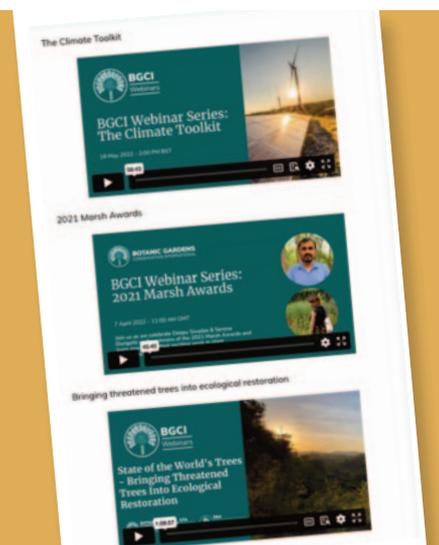


BGCI WEBINARS

BGCI is pleased to host the BGCI Webinar Series. This Series shares knowledge, ideas, and updates with BGCI and its Members, Partners, Donors, and Supporters around the world.

The webinars cover a range of subjects aligning with our strategy and BGCI projects, this includes events on red listing, forest restoration, policy and education. All webinars are recorded.

Please visit <https://www.bgci.org/our-work/sharing-knowledge-and-resources/bgci-webinars/> for more information and to view past webinars





**BOTANIC
GARDENS**
CONSERVATION
INTERNATIONAL

Descanso House, 199 Kew Road,
Richmond, Surrey, TW9 3BW, U.K.
Tel: +44 (0)20 8332 5953
E-mail: info@bgci.org
Internet: www.bgci.org
<https://twitter.com/bgci>

ROOTS

Volume 20 • Number 2 • October 2023 ISSN 0965-2574

ANNOUNCEMENT OF THE 11TH INTERNATIONAL CONGRESS ON EDUCATION IN BOTANIC GARDENS

BGCI are very pleased to announce that the Korea National Arboretum will be the hosts of the **11th International Congress on Education in Botanic Gardens (ICEBG)**. The Congress will take place in South Korea in spring 2025.

BGCI's International Congresses on Education in Botanic Gardens bring together practitioners, teachers, curators, researchers and academics to discuss new advances in education relevant to botanic gardens. These congresses are represented by botanic gardens from across the globe and are always an inspiring and informative event that provide opportunities to share ideas, meet old and new friends and discuss future priorities for education in botanic gardens.

With a focus on sustainability, the 11th ICEBG will be a hybrid event, offering the chance to attend in person or online. We hope this will mean that botanic garden colleagues from across the globe will have the chance to participate in this exciting event.

BGCI are delighted to be working with the Korea National Arboretum to organise this Congress and we can't wait to see as many of you as possible joining us (either in person or online) in South Korea in 2025.



Korea National Arboretum



**BOTANIC
GARDENS**
CONSERVATION
INTERNATIONAL