

Nigerian Montane Forest Project
Montane Forest Conservation Initiative Nigeria



Annual Report 2021



Biological Sciences
Pūtaiao Koiora

Cover image: Misa and Usman examine a *Eugenia gilgii* (Myrtaceae) tree, grown as a tree at the field station.

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Introduction



Anastasios (Tasso) Paul Leventis - Patron



Phil Hall (Chair)



John Adeyemi Adeleke



Danladi Umar



Hanaan Marwah



Jonathan Millard



Hazel Chapman

Writing this introduction without having physically been to the Project during the entire year is a first. However, thanks to excellent communication with the staff and a comprehensive report draft from Elisha Emmanuel it has not been difficult.

Thankfully Covid 19 has not noticeably impacted the local community and work with the Project has continued as usual, with students returning for research and work experience in September.

Mrs Sharon Ikeazor, Minister of State at the Federal Ministry of Environment, visited the Project during May. This was inspirational for the staff, especially the women. Ikeazor shared her appreciation of the Project with the Ministry and most generously on Twitter.

We reached the final round of the 2021 European Outdoor Conservation Association (EOCA) grant round. (see page 24).

This year has seen significant publications from the Project including on the ecosystem services provided by Ngel Nyaki forest (Tela *et. al.* a, b) and (Cuni-Sanchez *et al*). The latter paper, published in the journal Nature is significant for us because by including data from our forest plot in a global data set we are not only contributing to the identification of global patterns and trends in forest ecology (see Zhong *et al.* Nature Communications as well), but the uniqueness of Ngel Nyaki relative to other forests elsewhere becomes clear.

On a sad note, we remember two staff members, Chief patroller Abubakar and team leader of the ornithology section Yakubu Vugeh. Both will be sorely missed and Yakubu's knowledge will be hard to replace.

As always, a huge recognition of the Project management, Directed by Dr Danladi Umar and led by Misa Zubairu with assistance from Usman Abubakar and Alfred Christopher. Emmanuel Elisha, our science coordinator, has continued collecting data on the biodiversity of Ngel Nyaki Forest Reserve, advising the students on their studies and being a major contributor to the Project.

Our Advisory Board continues to provide unwavering support. Jonathan Millard (Lagos) has worked especially hard in identifying potential in-country funders. With his support and networks, we are learning about carbon credits- the carbon market - and have approached more corporates. Jonathan also organised a fundraising online seminar where Tom Morton from Climate Care, Danladi and I spoke about the value of the Project to Nigeria. We continue working towards a co-operative model of honey production.

Thanks to our sponsors for all for your support. In particular, thanks to the Taraba State Government and the A.G. Leventis Foundation for continued funding and to retired General T.Y. Danjuma for all he has done in the past.

We are hoping very much that New Zealand opens up its borders in 2022 and we can travel again and host Nigerian students at UC.

As always a huge thanks to Matt Walters for putting this report together, his Annual Reports are a flagship of the project.

Hazel Chapman

Executive Director, Nigerian Montane Forest Project

Our values

Mission Statement

To promote national and international commitment to the conservation of Nigeria's montane forests by inspiring excellence in research by postgraduate students and empowering local communities through employment and education.

Aims

1. To combine scientific research with education at both tertiary and local community level in order to develop long term sustainable management of Nigeria's montane forests.
2. To facilitate the involvement of national and international researchers in Nigerian montane forest research.
3. To involve the community in the management of montane forest ecosystems.
4. To work with the community in other ways, such as developing small businesses and working with schools to develop conservation awareness.

Our networks

Project Partners / Collaborators

African Nature Investors Foundation (ANI), Nigeria
A.P. Leventis Ornithological Research Institute (APLORI), Jos, Nigeria
Federal University of Kashere, Gombe State, Nigeria
African Nature Investors, Nigeria
Gombe State University (GSU), Nigeria
Mayfield Community Ecology Laboratory, The University of Queensland, Australia
Nigerian Conservation Foundation (NCF), Nigeria
Nigerian Meteorological Institute (NIMET) Nigeria
Nigerian National Parks (NNP), Nigeria
Prof Pierre-Michel Forget, Natural History Museum, Paris, France
Royal Botanic Gardens, Kew, England
Smithsonian Tropical Research Institute-ForestGEO, USA
Taraba State University (TSU), Nigeria
University of Canterbury (UC), New Zealand
University of Exeter (United Kingdom)

Project Funders

A.G. Leventis Foundation
A.P. (Tasso) Leventis
Retired General T.Y. Danjuma
Taraba State Government
University of Canterbury, NZ

A year of highlights

March

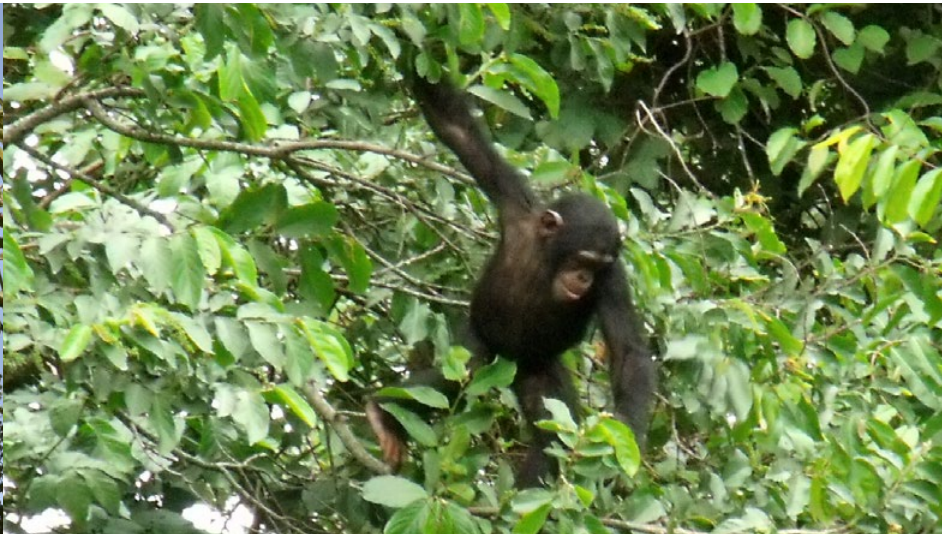
A publication about our local *Deinbollia* tree, now named as *Deinbollia onanae* (Sapindaceae). The species, new to science, was discovered in nearby Cameroon and is named after Dr Jean Michel Onana.

The images below are from Ngel Nyaki

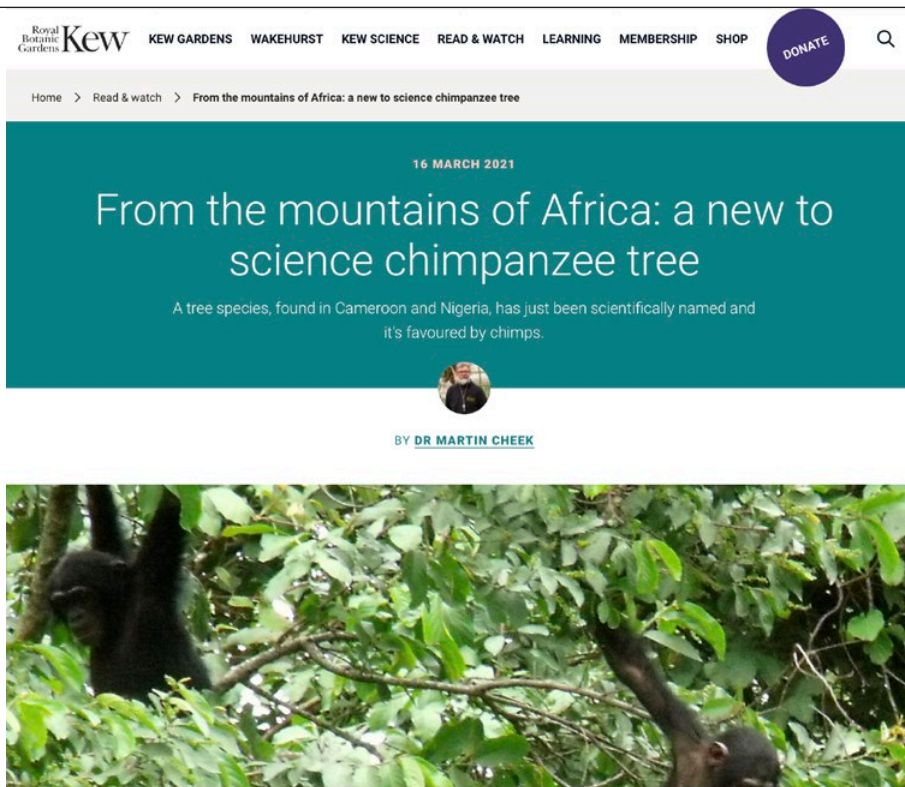
illustrating both *Deinbollia* and Ngel Nyaki chimps who we have shown love to eat their fruits and thus disperse the *Deinbollia* seeds. Now that there are few chimps left in Ngel Nyaki forest the future of this rare species is uncertain.

April

Iveren Abiem graduated in-person at UC. She was featured on the UC website during graduation, see the article on the following page.



Read the RBG Kew article about the discovery here: <https://www.kew.org/read-and-watch/africa-chimpanzee-tree>



Newly named for science, *Deinbollia onanae* (Sapindaceae), is a montane forest tree species related



Changing the world from NZ to Nigeria

After graduating with a doctorate in Ecology, Iveren Abiem will return home to Nigeria, where she will share her knowledge and expertise with students at the University of Jos.

Iveren Abiem's passion comes from enjoying what she does, and the sense of fulfilment she receives in knowing she's contributing to the attempted resolution of global problems.

"I feel that by putting myself out there, it may encourage that young girl who enjoys science to pursue her dream to become a scientist," she says.

Abiem has spent the last four years developing research into maintaining species diversity in tropical forests and managing the ForestGEO plot, in collaboration with the Nigerian Montane Forest Project.

A collaborative partnership between the University of Canterbury (UC), Nigerian Universities and other international partners, the Nigerian Montane Forest Project promotes a national and international commitment to the conservation of these unique natural landscapes.

Speaking about the importance of this

work and her research, Abiem says, "Africa is still under-represented in tropical forest research. Africa's forests have received far less attention than those in Asia and the America's despite contributing a carbon sink even higher than the Amazon."

Led by Abiem's PhD supervisor, UC Associate Professor Hazel Chapman, The Nigerian Montane Forest project, established in 2004, inspires excellence in research by funding postgraduate students while empowering local communities through employment and education, with 36 full-time, local staff.

"A woman like Ivy will make a real difference to Nigeria," Chapman says. "Her research is exactly what Africa needs in today's uncertainty surrounding climate change."

Chapman recently recommended Abiem for a L'Oréal-UNESCO Women in Science Award, noting her dedication to research and passion for furthering women's study in Nigeria.

"Iveren is keen to drive for more inclusion of women in her department at the University of Jos. I observed first-hand the tenacity and determination needed from her to find financial support for her PhD, in contrast to several male colleagues – yet she never gave up.

"As a manager, she showed natural leadership, training and managing 10 staff under hard, physical conditions. Despite threats from insurgents during 2018 and

2019, Iveren remained undeterred and continued visiting the plot on a regular basis. Most others would have remained in Jos."

Abiem shrugs off the praise, saying she was not particularly scared and was more concerned for the villagers she worked with.

Upon returning home, Abiem wants to support research that will promote policies to improve the livelihoods of Africans and the environmental and climate challenges faced by their continent. She will also continue to work with the Nigerian Montane Forest Project, managing the ForestGEO plot.

"I plan to use the skills I have acquired during my PhD to serve through teaching, training and mentoring as many students that I come across. If given the opportunity, I would also be willing to contribute to policymaking that would help protect forests in Nigeria and improve livelihoods."

Although she's excited to return to Nigeria, Abiem is sad to leave the home she has made in Ōtautahi Christchurch.

"I loved my time in Aotearoa and it will remain etched on my mind forever. UC was my ideal study environment, and I will miss it when I return to my home country after graduation."



May

Mrs Sharon Ikeazor, Minister of State at the Federal Ministry of Environment visited the Project with our Director, Dr Danladi Umar and Tunde Morakinyo, Executive Director, ANI Foundation. Ikeazor was especially pleased with the inclusion of women and girls in the Project and committed to increasing our profile within the Ministry.



Also, in May the Ngel Nyaki football team received their new jerseys from Usman.



June

Two important papers were published in June

First published was a paper in Nature Communications of a study which included data from our Ngel Nyaki Forest. ForestGEO Plot data from forests worldwide to show the importance of trees with arbuscular mycorrhiza in maintaining biodiversity. Arbuscular mycorrhiza are fungi which grow inside the roots of trees and benefit the tree by increasing the area by which the tree can absorb water and nutrients. In return, the fungus gets food from the tree.

[doi:10.1038/s41467-021-23236-3](https://doi.org/10.1038/s41467-021-23236-3)





Then a second paper, lead by Ridwan Jaafar- ex IT student at Ngel Nyaki: “So excited to share that our work at Ngel Nyaki and my very first, first author paper finally got published in *Biotropica*”.

“We surveyed fruit-eating birds and the interactions the birds had with trees. We also counted seeds dispersed by the birds into grassland and seedlings recruitment from these seeds. From this, we assessed seed dispersal and establishment limitations. We found that birds tended to be attracted by tall, leafless trees and

that the common bulbul, a small bird widespread across Africa, is responsible for dispersing ~ 70% of all seeds into the grassland at Ngel Nyaki. Our results provide an extremely useful insight into the restoration of Nigeria’s montane forests. Importantly they show that we cannot rely on passive restoration (i.e., fencing off grassland from burning and grazing) but instead, we need active tree planting to speed up forest recovery.”

July

Important Bird Area (IBA) Assessment

Elisha led the Ngel Nyaki team as part of the Birdlife International Important Bird Area (IBA) assessment for the Nigerian Bird Atlas. Ngel Nyaki was one of three IBA sites in North-Eastern Nigeria: Ngel Nyaki Forest Reserve, the Donga River Basin, and Gashaka Gumti National Park. The team recorded 392 bird species across all three habitats, ranging in elevation from 1800m (Mambilla) to 300m (Shendam Plateau State).

“Thank you Elisha Barde and all the able team of the Ngel Yaki Forest Reserve, NiBAP admires the unity and energy of your team. Continue to keep the team spirit “Team Ngel Nyaki!”





August

A talented team of field assistants, led by Elisha Emmanuel and Usman Abubakar and drawn from various sections of the Project- (plant taxonomy, ornithology, seed traits, forest regeneration) travelled around Ngel Nyaki Forest Reserve to explore the forest and to add to what we already know of the biodiversity it harbours.

September

The Mayo (River) Jiggawa flooded and destroyed our bridge which is essential for vehicle access to the field station. This was the largest flood in living memory and will have caused much erosion of topsoil from the surrounding farmlands.





October

Nigerian Bird Atlas Project The Nigerian Bird Atlas Project aims to map the distributions of Nigeria's bird species and to describe their status with the help and valuable input from Citizen Scientists. In October, this year a team from the Bird Atlas project visited Ngel Nyaki to survey our birds as part of a larger southern Taraba survey.

Photo: Members of the team visiting, NiBAP team from APLORI-Jos L-R: Arin Izang, Moses Ajang Gimba, Dr. Talatu Tende, Nanchin Winifred Kazehi, Christopher Tumba

<https://www.facebook.com/groups/NigerianBirdAtlas/posts/2832818127009817/>

November

Students of the Ezzo Nursery School and Government Day Secondary School Yelwa express appreciation for the work experience (IT students) teaching in their schools.



Forest regeneration

During 2021 the Project raised 12,000 seedlings from seeds collected around Ngel Nyaki Forest. Species included *Syzygium guineense*, *Cola gigantea*, *Pterocarpus erinaceus*, *Eugenia gilgii*, *Bridelia micrantha* and *B. speciosa* and *Vitellaria paradoxa*.

From these, the plant nursery team transplanted a total of 2,400 seedlings into the regeneration sites that had been burnt in late 2020 and early 2021. With help from the patrollers, the Yelwa football team and pupils from the Yelwa Esso Nursery and Primary schools, 16,000 seeds of *Anthonotha noldeae* and 2,000 seeds of *Pterocarpus erinaceus* (Rosewood) were planted directly into the grassland.

The trials of rosewood seedlings are especially important just now given the continuing rosewood trade between Nigeria and China. The removal of all rosewood from Taraba State continues, to the severe detriment of Taraba's forests. Moreover, now that rosewood is becoming scarce, loggers have moved onto other savannah species including *Khaya grandifoliola*, *Anogeiossus leiocarpa* and *Detarium guineense*.

During April two field assistants from the Project, Abubakar Bawuro and Mamud Umar, undertook forest restoration training with the Taraba State Ministry of Environment in Jalingo.



Repotting and watering seedlings in the plant nursery. L-R: Mamudu, Jafaru and Idris

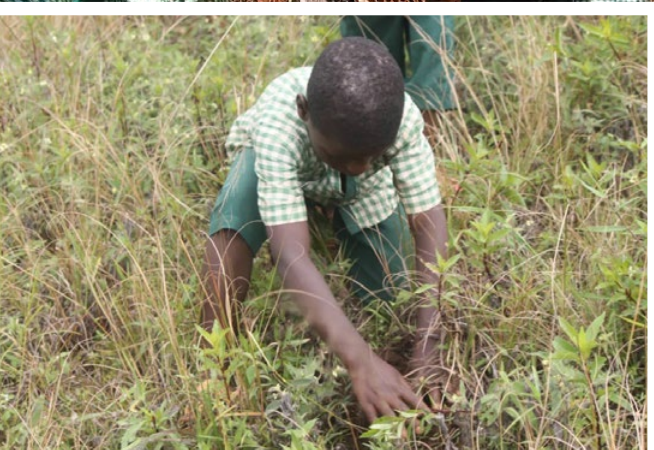


Planting of *Anthonotha* seeds in the regeneration sites around the camp that experienced fire.



forest restoration training in Jalingo

Combining education with restoration underpins our long term mission.



Students

PhD students

This year we hosted three PhD students for field work at Ngel Nyaki.



Gboyega Awoku

Gboyega is doing his research with UC. Supervisors are Hazel Chapman & Brad Howlett.

The main aims of Gboyega's research are to determine which pollinators are most important in pollinating the crops of Mambilla subsistence farmers, and which habitat is most important for these pollinators. To find this out Gboyega is undertaking a comprehensive survey of insect pollinators associated with Mambilla farms and testing pollination effectiveness using pak choi (*Brassica rapa* subsp. *chinensis*) as a test plant. Gboyega will grow pak choi in the nursery and move flowering plants around the landscape to count the pollen grains deposited by individual visitors on the pak choi stigmas. In this way Gboyega's finding will fit into a global data set of pollinator effectiveness of pak choi.



Eric Bemuh Febnteh

Eric is a student from University of Bamenda, Cameroon and was based at Ngel Nyaki for part of his study into the ecology of oyster mushrooms—genus *Pleurotus*—in the montane forests of Cameroon and Nigeria. *Pleurotus* grow on trunks of a wide range tree species. However human activities have led to the destruction of many of these host trees which will have negative consequences for the oyster mushrooms.

The main objective of this research is studying the abundance and diversity of *Pleurotus* species and host trees, natural regeneration status of the host trees, *Pleurotus* seasonality and host tree phenology at both Etinde (Cameroon) and Ngel Nyaki montane forests.

So far at Ngel Nyaki four oyster mushroom species (*Pleurotus ostreatus*, *P. eryngii*, *P. pulmonarius* and *P. djamor*) have been observed growing on four host trees species (*Margaritaria* sp., *Ficus lutea*, *Polyschias fulva* and *Anthonotha noldeae*) respectively. The mushrooms fruit during October to December.



Julius Yani

Julius is a student of Modibbo Adama University, Yola, and is working on plant species diversity and carbon sequestration in three ecological zones of Nigeria. Ngel Nyaki being the afro-montane zone. Supervision is by Dr. Dishan Ephraim and Prof. David Jatau.

MSc student



Ahmed Abdulrahman

Ahmed is a master's student in Geography at Lagos State University. Through our EOC twitter campaign for votes, Ahmed heard of the Project and offered to volunteer at Ngel Nyaki. This in part led to him researching the application of remote sensing data (Landsat and Sentinel-1 SAR) to monitor and map forest canopy cover using Ngel Nyaki forest reserve, as his MSc research project.

Aside from the remote sensing aspect of the research, part of the research objectives is to evaluate forest structural variables in the Ngel Nyaki ForestGeo plot which he will integrate with the results from the analyzed remote sensing data.



Industrial Training (IT) students

This year the project was able to accommodate 21 undergraduate students from Taraba State and Abubakar Tafawa Belewa Universities for their work experience IT scheme. The students learn by engaging in our research activities with researchers and field assistants.



Biological Science Students, TSU. L-R: Danladi Austine Yuguda, Anna Ahmed Kute, Adamu Tasiu Usman, Fatima Adamu Gajere, Bulus Jibaniya Hwadi, Abang Jacinta Anku, Luka Samuel and Lovina Amos Dimu



Above. Students of Applied Ecology, Abubakar Tafawa, Belewa University (ATBU) Bauchi; L-R: Salisu Abdulkarim and Hyela Clarkson Yaduma.



Left. Faculty of Biological Sciences and forestry and wildlife students TSU; L-R: John Mono Auta, Fidelis Samuel, Lovence Henry, Mercy Danladi Aji, Adamu Suleiman Titong, Demnyo Sunita Femi, Bitrus Pyapanba Japhet, Mercy Daniel, Patrick Nyunkaya Kanga, and Iliya Yohanna.

Visitors

Student field trip

The Project accommodated Biological Sciences MSc students from Taraba State University on a field course.

L-R: Cletus Tari, Prof. Delphine David, Mrs. Esther R. Adamu, Shekarau Bandekaji M, Ipana Dorcas Bappa, and Jamus Fred.



Bird researchers

The Project received Nigerian Bird Atlas team from APLORI.



Undergraduate student research



Abelmochus esculentus



Hibiscus cannabinus



Hibiscus culeatus



Hibiscus vitifolius



Malvaviscus penduliflorus



Pavonia columella

Ethnobotany of the mallow family

Hadiza Mafindi Sanusi, a final year student from TSU botany department returned to conclude her work which she started during her IT with us in 2019.

Hadiza conducted an Ethno-botanical survey of the local Malvaceae, to understand their cultural values as held by the five ethnic groups (Kaka, Mambilla, Ndola, Kanbo and Fulani) found around the reserve.



Pavonia odorata



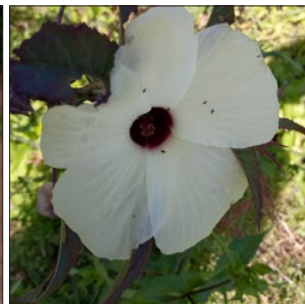
Sida rhombifolia



Sida acuta



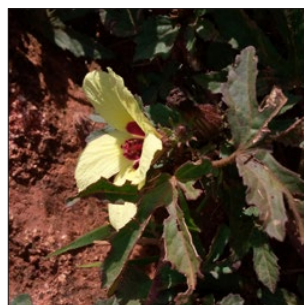
Urena lobata



Hibiscus sp1



Hibiscus sp3



Hibiscus sp4



Hibiscus sp5



Pavonia sp1

Assessment and diversity of bees of Ngel Nyaki forest reserve

Jibaniya Hwaji, an undergraduate student from biological sciences, TSU conducted a survey to assess bee diversity and relative abundance within and around Ngel Nyaki forest reserve. This is important because bees are major pollinators of both native trees, Eucalyptus, and crops—yet globally pollinators are in decline. It is therefore important to know which species are here now as a benchmark for future studies.

Sampling was opportunistic, monitoring flowering plants for bee visitors when they were available. Jibaniya used a sweep net to collect the bee visitors and in total collected 643 individuals for identification. From these 15 bee species were identified using identification keys and on-line resources with a further 3 unable to be unidentified - making a total of 18 species in total (Table 1). The most abundant species caught was the honeybee comprising 38% of the bees collected. The least abundant species was *Osmia* sp. with two individuals captured in total.



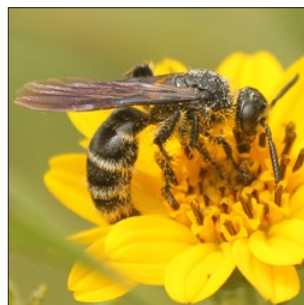
Apis mellifera, honeybee



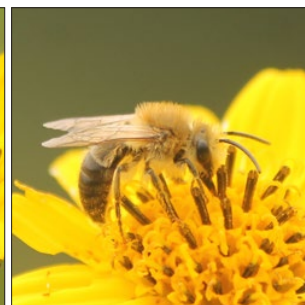
Bombusa sp., bumblebee



Meliponula beccarii, ground honeybee



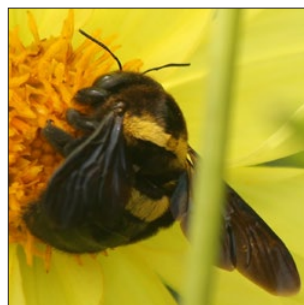
Peponapis pruinosa, squash bee



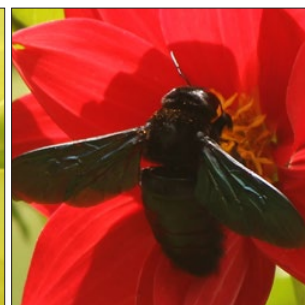
Peponapis sp., squash bee



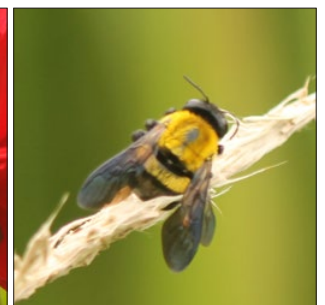
Xylocopa augusti, carpenter Bee



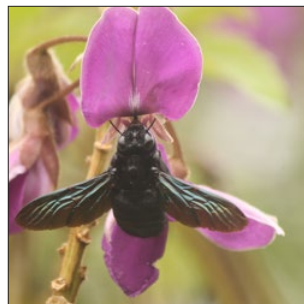
Xylocopa caffer, double yellow band



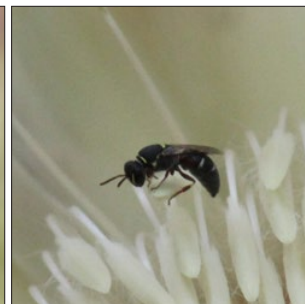
Xylocopa iris



Xylocopa sp.



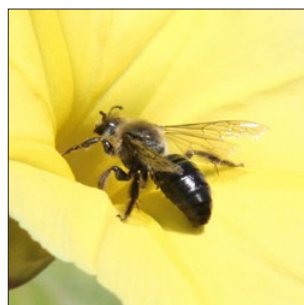
Xylocopa violacea, carpenter bee



B1



B2



B3



B4

Photos by Elisha Emmanuel Barde of some of the great diversity of bee species found in Ngel Nyaki.

Identification of beetles (Coleoptera) in the grassland and forest fragments of Ngel Nyaki forest reserve

Anna Ahmed Kute from Biological Sciences TSU, carried out a survey of the beetle species in the grasslands and forest edge of Ngel Nyaki.

A total of 24 beetle species were collected across two habitat types. Of these, 19 were identified to genus and species level while 6 were unidentified.

The most abundant and diverse habitat for beetles was the grassland rather than forest edge, which was surprising.

Photos by Elisha Emmanuel Barde of some of the beetle species found in Ngel Nyaki.



Harmonia sp. lady beetle



NB 1. lady beetle



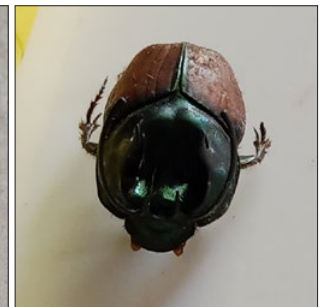
Mylabris quadripunctata



Mylabris sp1



Mylabris sp2



Proagoderus sexcornutus



Onthophagus sp. dung beetle



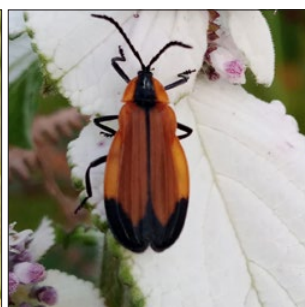
NB2 grapevine beetle



Rhagonycha mollis



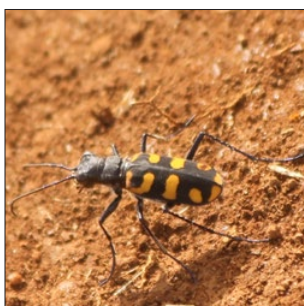
NB3 yellow spotted ground beetle



Calopteron terminale



Chlorocara africana



Crioceris sp.



Augosoma sp. rhino-beetle



Agrypnus sp. click beetle



NB5 June beetle



NB6



Carrion beetle



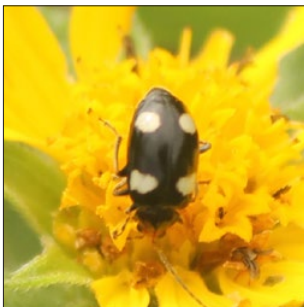
Macradestia sp. darkling beetle



NB7



NB8



NB 9



NB10



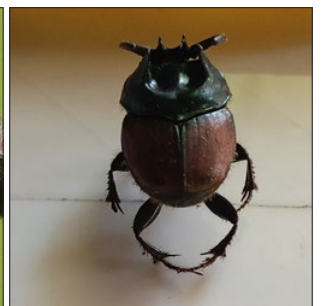
Pachnoda stehelini green June beetle



CNB11



Carabus violaceus, violet ground beetle



Proagoderus sixcornutus

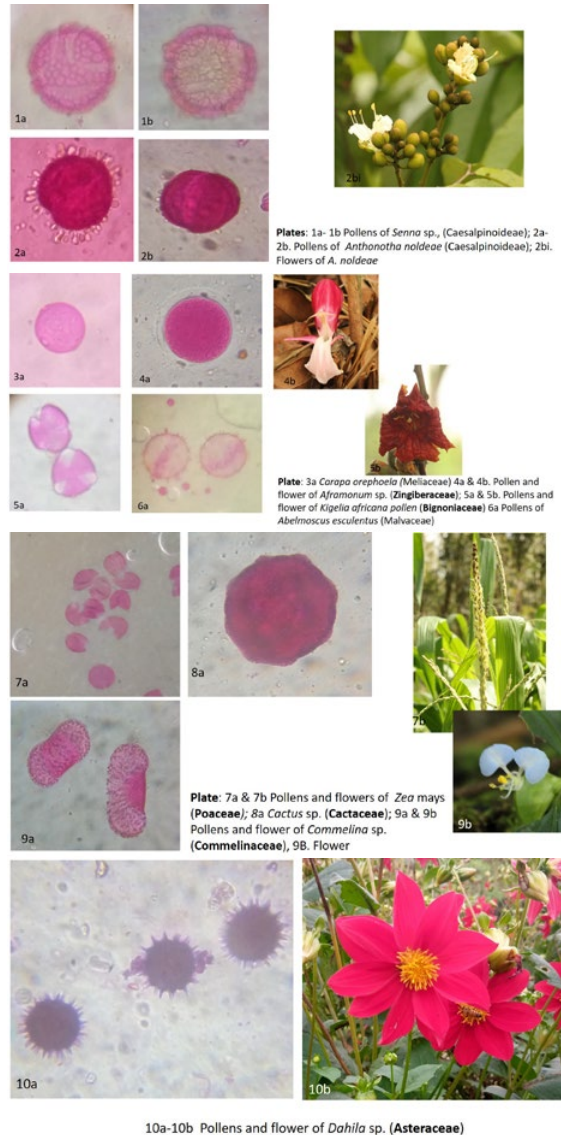
Biodiversity at Ngel Nyaki

Pollen diversity

A pilot study which aims to create a reference pollen bank for NNFR, Elisha and Lovina Amos (an IT Student) made a collection of pollen from over 50 plant species of herbs, lianas, woody trees, grasses within and around Ngel Nyaki Forest Reserve (Table 1). Being able to identify pollen grains to genus level on insect bodies will allow us to better understand plant-pollination interactions for many different studies.

Elisha and Lovina have so far collected pollen from 70 common flowering plant species across 56 genera and 30 families within the reserve.

Using purple fuchsin gel, they swabbed flowers for pollen, melted the gel with stained pollen onto microscope slides and observed the structures. Pollen size, shape, surface wall thickness and aperture type were recorded. While it was not possible to differentiate to the species level, they were often able to identify to the genus level and always to Family, especially Asteraceae and Fabaceae. This suggests potential for a pollen key for taxonomic characterization necessary for better understanding of plant-pollinator interactions across Nigeria.



Pollen samples collected

S/N	Family	Some species
1	Amaryllidaceae	<i>Crinum latifolium</i>
2	Acanthaceae	<i>Asystacia gangetica</i>
3	Melastomatceae	<i>Dissotis</i> sp
4	Asteraceae	<i>Aspilia</i> sp.
5	Bignoniaceae	<i>Kigelia africana</i>
6	Brassicaceae	<i>Brassica</i> sp
7	Caesalpinioideae	<i>Senna</i> sp
8	Clusiaceae	<i>Psorospermum auranticum</i>
9	Commelinaceae	<i>Commelina</i> sp
10	Convulvolaceae	<i>Ipomoea</i>
11	Cucubitaceae	<i>Cucubit</i>
12	Euphobiaceae	<i>Ricinus communis</i>
13	Lauraceae	<i>Persea americana</i>
14	Liliaceae	<i>Scadoxus multiflorus</i>
15	Malvaceae	<i>Sida acuta</i>
16	Meliaceae	<i>Carapa orephoela</i>
17	Mimosoideae	<i>Dichrostachys cinerea</i>
18	Musaceae	<i>Musa</i> sp
19	Myrtaceae	<i>Eucalyptus camadulensis</i>
20	Oleaceae	<i>Jasminum</i> sp
21	Orchidaceae	<i>Ochid</i> sp
22	Passifloraceae	<i>Passiflora purpurea</i>
23	Pineanaceae	<i>Pinus</i> sp
24	Poaceae	<i>Zee mays</i>
25	Rubiaceae	<i>Psychotria</i> sp
26	Rutaceae	<i>Clausena anisata</i>
27	Solanaceae	<i>Solanum</i> sp
28	Tiliaceae	<i>Grewia occidentalis</i>
29	Vitaceae	<i>Cissus</i> sp
30	Zingiberaceae	<i>Aframomum</i> sp

In memorandum



We are very sad to have lost two key people associated with the Project and Ngel Nyaki.

Yakubu Vagn (above, centre) was an outstanding birder and was pivotal to many postgraduate student projects. Yakubu has been with the Project for many years, working alongside Dayo, Charles, Murna and more recently Gboyega.

Abubakar was our Chief Patroller (right, centre) and managed the protection of Ngel Nyaki Forest Reserve- employed by Taraba State Forestry.



Publications

- Zhong, Y., Chu, C., Myers, J. A., Gilbert, G. S., Lutz, J. A., Stillhard, J., . . . Zimmerman, J. K. (2021). Arbuscular mycorrhizal trees influence the latitudinal beta-diversity gradient of tree communities in forests worldwide. *Nature Communications*, **12**(1). doi:10.1038/s41467-021-23236-3
- Tela, M., Cresswell, W., & Chapman, H. (2021). Assessment of Pest Control Services by Vertebrates in Nigerian Subsistence Maize Farms. *Conservation and Society*, **19**(4), 218-224. doi:10.4103/cs.cs_213_20
- Jaafar, R., Yadok, B., Elisha, E., & Chapman, H. (2021). Grassland trees and the common bulbul *Pycnonotus barbatus* promote Afromontane forest restoration. *Biotropica*. doi:10.1111/btp.12986
- Cuni-Sanchez, A., Sullivan, M. J. P., Platts, P. J., Lewis, S. L., Marchant, R., Imani, G., . . . Willcock, S. (2021). High aboveground carbon stock of African tropical montane forests. *Nature*, **596**(7873), 536-542. doi:10.1038/s41586-021-03728-4
- Tela, M., Cresswell, W., & Chapman, H. (2021). Pest-removal services provided by birds on subsistence farms in south-eastern Nigeria. *PLoS ONE*, **16**(8 August). doi:10.1371/journal.pone.0255638
- Agaldo, J., Christianini, A. & Chapman, H., (2021). Interactions between ants and non-myrmecochorous diaspores in a West African montane landscape. *Journal of Tropical Ecology*. doi:10.1017/S0266467420000231
- Fotang, C., et al. (2021). Environmental and anthropogenic effects on the nesting patterns of Nigeria–Cameroon chimpanzees in North-West Cameroon. *American Journal of Primatology* **83**(9): e23312.
- Fotang, C., et al. (2021). Human Activity and Forest Degradation Threaten Populations of the Nigeria–Cameroon Chimpanzee (*Pan troglodytes ellioti*) in Western Cameroon. *International Journal of Primatology* **42**(1): 105-129.

Papers submitted

- Emmanuel Barde Elisha, Israel Adedeji Bolade, Nanchin Winifred Kazeh, Adamu Mohammed, Elijah Nicodemus Mafenne, Sanusi Dahiru, Hazel Chapman, (2021). First Breeding record of Petit’s Cuckooshrike in Nigeria, Western Africa. Submitted to *Malimbus*
- Emmanuel Barde Elisha, Laiche Danladi Tibins, Cleophas Billah & Hazel Chapman. (2021). Macrofungi of Ngel-Nyaki Forest Reserve, Mambilla Plateau, Taraba, Nigeria Submitted to fieldguides.fieldmuseum.org

Thanks to our amazing Smithsonian Team at Ngel Nyaki for your contribution to this key findings of the Nature paper- **Afromontane forests store much more carbon than we thought.** Data from 44 forests including Ngel Nyaki show **montane forests store more carbon than was previously though and more per unit area than Amazon rain forests**

Outreach

The two interviews came out of our twitter campaign for the European Outdoor Conservation Association (EOCA).

We applied for funding from the organisation and made it into the final round. This is decided by a public vote-based on social media.

The Project had never been involved in a public vote and had no idea what it required.

Thanks to our twitter friend, Andrew Fleming, Ex Abuja British High Commission, we got right into it and by the end of our campaign had what was described to me by the Nigerian President's Special Advisor on digital media, as **“the biggest twitter campaign in Nigeria for a long time!”**

All our interactions with Twitter folk have increased our profile greatly, and without doubt the profile of the Project has risen both nationally and internationally.



Interview with Seyifunmi Adebote host of ClimateTalk Podcast

<https://podcasts.apple.com/gb/podcast/climate-talk-podcast/id1450170059>



Interview with Ugochi Oluigbo, Environment Journalist for Green Angle



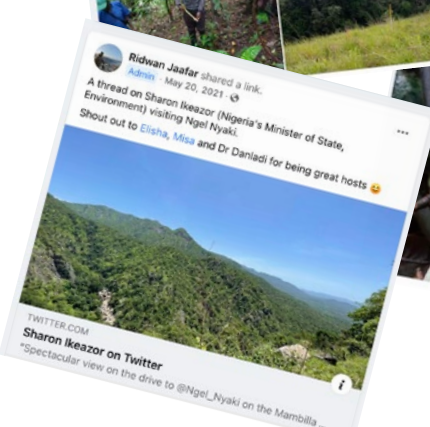
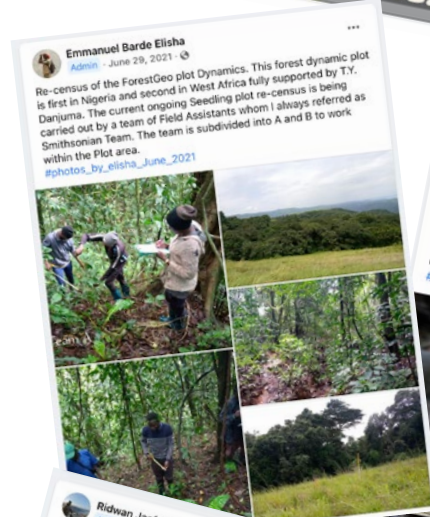
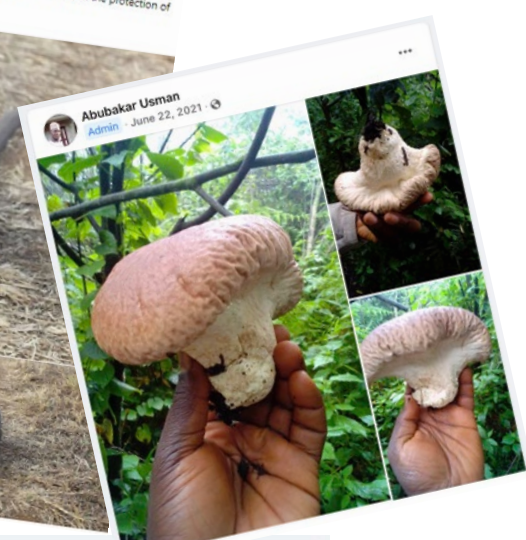
The flyer for the online seminar that Danladi and Hazel spoke at in August.

Social media

Our social media continues to grow.

957 Twitter followers

1780 Facebook members



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