



2009 In Review

Acacia erioloba, Camel Thorn [Eng.], Kameeldoring [Afr.] in Hwange National Park, Zimbabwe.

2009 has been an exciting year for Plant DNA Barcoding, and a lot of things that we've been working towards were achieved. An international team of 52 scientists (Consortium for the Barcode of Life Plant Working Group under the leadership of Dr Pete Hollingsworth, Royal Botanic Garden, Edinburgh), including three researchers from the University of Johannesburg, has concluded a four-year effort to find a standard "plant DNA barcode": The findings were published in the *Proceedings of the National Academy of Science* in which a combination of two gene regions, taken from the plastid genes (*rbcl* and *matK*), were selected as barcodes for land plants.

DNA Barcoding trees and shrubs of the Kruger National Park (KNP) — Resulting from several collecting trips in 2009, the target of producing a phylogenetic tree for all genera of flora within the KNP has progressed well, with most taxa of trees and shrubs (315 out of 400 species) completed for the *rbcl* and *matK* genes. All data are available on the BOLD system (<http://www.boldsystems.org/>). A large portion of the sequencing was done at the Canadian Center for DNA Barcoding, Biodiversity Institute of Ontario, University of Guelph with funding from Genome Canada through the Ontario Genomics Institute. Of the remaining 20% of trees and shrubs (which are extremely rare), 15% have been collected and a dedicated trip for the remaining 5% is planned for 2010. In addition to this, approximately 1 200 herbaceous species have also been collected in the KNP. DNA collection is stored at the University of Johannesburg (UJ), and all vouchers are housed at the herbarium at UJ, Skukuza (Research Centre, KNP) and at the South African National Biodiversity Institute (SANBI) in Pretoria. A new species, *Combretum nwambiyana* O. Maurin, M. Jordaan and A.E. van Wyk, is currently being described in the KNP.

Kowiyou Yessoufou (PhD student at UJ) has collected data (species identification, frequency and ecological data) from 110 plots across all 16 ecozones within KNP. He will start with the phylogenetic diversity analyses in 2010.

TreeBOL Africa — There has also been considerable progress made on TreeBOL: barcoding the trees of Africa. Approximately half of the trees of southern Africa have now been collected and sequenced for *matK* and *rbcl*. Data have been submitted and are available on the Barcoding Of Life Database (University of Guelph, Canada) system. New projects have been initiated and launched, for example the 'Barcoding of the trees of the Delta Niger' (Prof Bosa Okoli and Dr Ikechukwu Agbagwa from the University of Port Harcourt, Nigeria), and the 'Trees of Mauritius' (Prof Yasmina Jaufeerally-Fakim from the University of Mauritius).

Toyota Conservation Outreach 2009 — TreeBOL Africa was also involved in the Toyota conservation outreach project in association with the southern Africa Wildlife College, Game Rangers Association of Africa, and the Peace Parks Foundation. This is a unique project focusing on supporting conservation students and their management on their 'home turf', and identifying and addressing needs hampering conservation management in southern Africa. This year the focus was on Zimbabwe and Malawi and during October 2009 several parks in these countries were visited. The trip was a huge success: Dr David Mabunda (SANParks) remarked "I believe this trip has allowed the employees to experience conservation issues from a different perspective, and these conservationists will now be more aware of challenges outside of a SANParks perspective". Visit the website <http://www.toyotaoutreach.com/> for more information, a slide show and a nine minute video. We are very grateful to the sponsors (Toyota, 4x4 Mega World, Campworld, Good Year, Cross Country, Garmin, National Luna, Klipbakkop Mountain Reserve, and Varta), who made this outreach trip possible.

GrassBOL southern Africa — Our initial aim is to DNA barcode the ~1 000 native and introduced grasses of southern Africa. Currently we have 91 grass species (mostly from the KNP) sequenced for *rbcl* and *matK*; data is available on the BOLD database. This data will be incorporated into a global project where scientists are collaborating to create



Olivier Maurin teaching one of the research staff at Cape Maclear National Park in Malawi how to identify and press plants in the field during the Toyota Environmental Outreach field trip.



Kowiyou Yessoufou, Stanley Khumalo, and Michelle van der Bank collecting plant material for the UJ Plant DNA Bank in Mpumalanga, South Africa.

genetic barcodes for up to 20 000 grass species around the world.

Training at UJ — Training has again played a central role in our activities and, coupled with organised training courses held in Africa, there have been several visits by UJ students to the UK to receive additional training and exposure.

A course on 'DNA barcoding and grant writing skills (logframes)' was given to 20 participants from five African countries (Ethiopia, Cameroon, Ghana, Nigeria, South Africa) at UJ on 26-30 January 2009. The goals of the course were to: transfer knowledge to scientists, researchers, conservationists, administrators/policy makers and students with regard to practical DNA barcoding, and to enhance the research grant writing skills of the participants. The International Consortium for the Barcode of Life (CBOL), UJ, and Royal Society, UK / National Research Foundation, SA provided sponsorship for the course.

Dr Martyn Powell (Imperial College Silwood, UK) visited UJ from 21 March to 05 April 2009 to continue training South African project partners in Amplified Fragment Length Polymorphism PCR. A two-week period of hands-on training was given in the Molecular Systematics Laboratory at UJ, in addition to theoretical discussions on the applications of this technique in conservation.

One month hands-on training in molecular techniques and DNA barcoding was given to two Nigerian researchers (Dr Helen Imafidor and Dr Ikechukwu Agbagwa) from the University of Port Harcourt, Nigeria (05 July to 05 August 2009) at UJ.

Cynthia Motsi spent one month at Imperial College (04 May to 31 May 2009) to work with Prof Vincent



10 cars and 20 people set off on the 2009 Toyota Environmental outreach project to Malawi and Zimbabwe. In total we travelled approximately 7 000 km and visited six National Parks.

THE DNA BARCODING HERALD

January 2010

Adansonia digitata, Baobab [Eng.], Kremetart [Afr.] – Gonarezhou National Park, Zimbabwe.



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Attendees of the 'DNA barcoding and grant writing' course get hands-on laboratory experience at UJ.



Cynthia Motsi receiving her PhD degree at the October graduation ceremony at UJ.

Savolainen and Dr Martyn Powell on finalising her PhD thesis. Kowiyou Yessoufou visited Prof Savolainen's group for two weeks (26 June to 11 July 2009) to receive training in data analyses of leaf area, in addition to various phylogenetic software packages. Olivier Maurin visited Imperial College London and the Jodrell laboratory, Royal Botanic Gardens, Kew during August 2009 to work with Prof's Vincent Savolainen and Mark Chase and Dr Felix Forest.

Highlights

- Cynthia Moleboheng Motsi received her PhD degree at the graduation ceremony on 01 October 2009. Cynthia accepted a two-year post-doc research position at the South African National Biodiversity Institute (SANBI) to work on the "Tree of Life of South Africa".
- Olivier Maurin submitted his PhD entitled "A phylogenetic study of the family Combretaceae with emphasis on the genus *Combretum* in Africa" in December 2009. He will receive his degree at the graduation ceremony in May 2010. Olivier accepted a post-doc position at UJ where he will be managing the TreeBOL Africa project.

New Team Members at UJ

MSc students:

- Ledile Mankga – DNA barcoding medicinal plants of southern Africa.
- Philip Rossouw – Development of accurate DNA-based identification tools for African *Encephalartos* spp. to address conservation issues in South Africa.
- Bruce Kyalangalilwa – Phylogenetic relationships of *Quisqualis* (Combretaceae) inferred from nuclear and plastid DNA sequence data.
- Barnabas Daru – DNA barcoding tree species from the Miombo woodlands in southern Africa using

sequence data from the *rbcl* and *matK* regions.

PhD students:

- Jephris Gere – Phylogenetic relationships within the subtribe Terminaliinae (Combretaceae)
- Mark Cooper – Evolutionary history and biogeography of Mimosoideae (Leguminosae): an emphasis on African taxa.

Technical Support:

- Rene Tong (PhD student) works one day per week in the Molecular Systematics Laboratory. Her main responsibilities are the compilation of field collections into the 'florakrugerpark' database, along with the submission of DNA sequence data to BOLD.
- Stanley Khumalo (laboratory assistant) assists one day per week. His main responsibilities include sorting out herbarium samples from the fieldtrips and scanning them for BOLD.
- Flip Minnaar (MSc student) is responsible for the running of the ABI sequencer.

Goals for 2010

- Produce a complete electronic database for the trees of southern Africa, which will include DNA barcodes, herbarium scans and images.
- Course in DNA barcoding techniques and grant writing skills presented to delegates from six southern African countries in collaboration with Imperial College London.
- Phylogenetic diversity analysis & conservation proposal for KNP.
- DNA Barcoding of 50% of the medicinal plants of South Africa.
- DNA Barcoding of 70% of the grasses of southern Africa.
- All 62 *Encephalartos* species sequenced for *rbcl*, *matK*, *trnH-psbA* and ITS.



Visit our website for more information at: www.florakrugerpark.org or www.uj.ac.za/botany

2010 CALENDAR

Fruit of *Turrea obtusifolia* – Small Honeysuckle-tree [Eng.]; Kleinkanferfoelieboom [Afr.] – Kruger National Park.

JANUARY 2010							FEBRUARY 2010							MARCH 2010							APRIL 2010						
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3	4	5	6	7	8	9	7	8	9	10	11	12	13	7	8	9	10	11	12	13	4	5	6	7	8	9	10
10	11	12	13	14	15	16	14	15	16	17	18	19	20	14	15	16	17	18	19	20	11	12	13	14	15	16	17
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MAY 2010							JUNE 2010							JULY 2010							AUGUST 2010						
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9	10	11	12	13	14	15	13	14	15	16	17	18	19	11	12	13	14	15	16	17	15	16	17	18	19	20	21
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23	24	25	26	27	28	29	27	28	29	30				25	26	27	28	29	30	31	29	30	31				

SEPTEMBER 2010							OCTOBER 2010							NOVEMBER 2010							DECEMBER 2010						
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26	27	28	29	30			24	25	26	27	28	29	30	28	29	30					26	27	28	29	30	31	

PUBLIC HOLIDAYS 2010

1 January (New Year's Day); 21 March (Human Rights Day); 22 March (Public Holiday)
 2 April (Good Friday); 5 April (Family Day); 27 April (Freedom Day); 1 May (Workers' Day)
 16 June (Youth Day); 9 August (National Women's Day); 24 September (Heritage Day)
 16 December (Day of Reconciliation); 25 December (Christmas Day);
 26 December (Day of Goodwill); 27 December (Public Holiday)



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JANUARY 2011							FEBRUARY 2011							MARCH 2011							APRIL 2011							MAY 2011							JUNE 2011						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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JULY 2011							AUGUST 2011							SEPTEMBER 2011							OCTOBER 2011							NOVEMBER 2011							DECEMBER 2011							
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
31						1			1	2	3	4	5					1	2	3	30	31					1				1	2	3	4	5				1	2	3	4
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For the 2010 Calendar and The DNA Barcoding HERALD: Photographer: Olivier Maurin [Copyright of photographs: © Olivier Maurin: olive.maurin@gmail.com]; [All photographs taken with a Nikon D200]

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