

Studying the Understudied: Reptile Diversity in African Savannas Field Course

Robin Maritz and Bryan Maritz tell us about how reptiles are being used to teach students about scientific research and biodiversity.

South Africa boasts an exceptional diversity of plants and animals. However, not all taxa, i.e. groupings of species, receive the attention they might deserve. Reptiles (i.e. snakes, lizards, crocodiles, and tortoises) are a largely misunderstood group of animals and many of the species are deeply feared by humans. There are over 400 species of reptiles in South Africa, many of which are found nowhere else in the world. Despite this, few resources are

directed toward studying reptiles or attempting to understand their biology, and this has constrained educational endeavours and resulted in a remarkable lack of human capacity regarding the understanding and management of these animals. With these needs in mind, researchers from the University of the Western Cape recently developed and successfully ran the first ever field-based research course to focus exclusively on reptiles during December 2017.

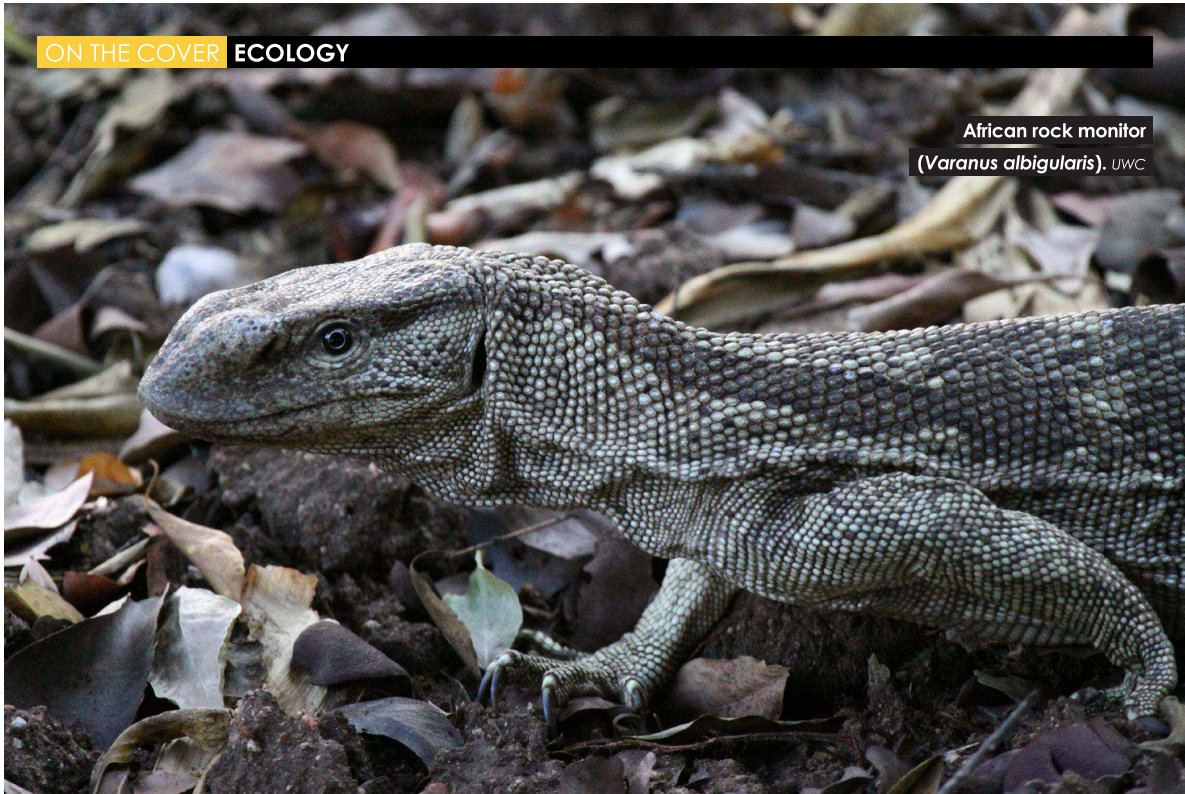
COURSE MISSION

The Reptile Diversity in African Savannas field course (RDAS) wanted to give enthusiastic University of Western Cape, University of Mpumalanga, and University of Venda students, the future generation of conservation biologists and managers, the opportunity to experience intact African savannas and their associated biodiversity. Specifically, RDAS aimed to empower deserving students who would not otherwise have to opportunity to visit large formal protected areas due to the economic challenges they face. RDAS provided an outdoor classroom, rich in hands-on learning and field research that would provide skills and knowledge to budding scientists, and ultimately, we hope, support the development of skilled human capital in South Africa.

Although reptiles exhibit fascinating biology, few people recognise their value, resulting in a severe shortage of human resources with the technical skill set and motivation to study and monitor reptiles. Furthermore, socio-economic inequality, along with misconceptions and cultural perceptions of reptiles, has resulted in limited transformation among the South African reptile research community. RDAS aims to close this gap by training students how to study and survey reptiles using field-based methods. Moreover, data collected during RDAS additionally informs a long-term survey that seeks to understand local reptile communities in the Kruger National Park, which is necessary for informing ecosystem management practices.



Students and staff worked together to install reptile trap arrays. UWC



African rock monitor
(*Varanus albigularis*). UWC

LOCATION, LOCATION, LOCATION

The Kruger National Park covers more than 19 000 km² of land made up of several distinct bioregions dictated by geology, rainfall, and vegetation type. There are over 160 species of reptiles thought to exist within the park and their occurrence varies across the remarkable diversity of habitats. Importantly, the park offers an opportunity for visitors to be immersed in a truly wild place, complete with an intact megafaunal community. If you have ever had the opportunity to visit the Kruger National Park, you know how special it is to be surrounded by wonderful savanna habitat and incredible biodiversity. Visiting pristine habitats, especially those with megafauna, is a privilege that all South Africans should experience at least once in their lifetime, especially budding biologists.

Despite being a globally-renowned protected area, reptile diversity has largely been unstudied and unmonitored within the park in the last 30 years. Given this context, and the availability of the newly established Skukuza Science and Learning Initiative Campus at Skukuza, which offers accommodation, kitchen facilities, a lecture hall, a library, and laboratory space, the Kruger National Park was the obvious choice of location to hold RDAS.

EDUCATION THROUGH EXPERIENCE

Learning through experience provides a first-hand opportunity for students to learn about biology. Spending time in the field provides students with opportunities that cannot be recreated in a traditional lecture hall. The combination of reinforcement through visualisation and self-learning makes the outdoor environment a highly engaging classroom.

During the course, students were able to identify and engage with nearly 40 species of reptiles. These ranged from spiny cordylid lizards to giant rock monitors, and from tiny thread snakes, measuring less than 10 cm, to the infamous black mamba, represented by a calm individual snake measuring 1.8 m length that entered the field station. Finding and identifying snakes always brought a sense of excitement for students and staff alike. During the course, nine species of snakes were located including a range of harmless species, such as the exotically coloured common tiger snake that we found hunting sleeping skinks among the crevices of a wall one night. Despite many of the students entering the course with a fear of snakes, every student wanted to hold the charismatic creature.

As a unified field team, students and staff constructed and installed the



Peter's thread snake (*Leptotyphlops scutifrons*). UWC



Eastern tiger snake (*Telescopus semiannulatus*). UWC

trapping arrays that formed the basis of the reptile survey. Each trapping array required five plastic buckets (pitfall traps) to be dug into the ground, four sheets of plastic fencing (drift fences) that steer animals toward the pitfall traps, and eight funnel traps. Each morning and afternoon students and staff were loaded onto an open-air game drive vehicle and headed into the veld accompanied by Thomas, our trusted game guard, for protection. Students learned to identify, handle, and release each of the critters captured each day including some frogs which were summoned by the rains. In total, 50 individual reptiles (13 species) were captured and released during the project.

To encourage hypothesis generation and testing, students worked in groups to develop their own projects, performed the field sampling, and conducted the appropriate statistical analyses. Groups investigated whether species diversity differed across the landscape, whether lizard body condition improved near to human habitation, and whether active searching or trapping produced a more complete species list for any given area.

To supplement the experience in the field, students received lectures covering a range of topics from ecology, evolution, physiology, survey techniques, and reptile identification. Providing a few lectures in between field sessions ensured students had the necessary background information and facilitated connections between observations, ideas, and bigger



RDAS students found a female puff adder (*Bitis arietans*) during an active searching session. UWC

picture questions. Lecture material and field research were organised to provide a cohesive introduction to reptile biology and research approaches.

GOING BEYOND A FIELD COURSE IN HERPETOLOGY

Kruger boasts a diversity of reptiles, but it is also home to more famous animals like lions, elephants, and rhinos. The presence of such megafauna fundamentally changes how one perceives and interacts with the environment. Walking through the bush knowing there could be large mammals nearby

is energising and instructing students who are excited about their environment improves the educational experience. Listening to a lecture on savanna ecology while in the heart of the Lowveld helps to contextualise information and reach learning objectives more easily.

An extended field course also provides a forum for personal development. Inquiry-based tasks and hands-on activities are superior ways of promoting self-efficacy in students. These learning approaches aid in students becoming self-learners. Field experience provides the opportunity to explore interests and assess values, and the exploration



**Limpopo girdled lizard
(*Cordylus jonesii*). UWC**



Black mamba (*Dendroaspis polylepis*). UWC

of curiosities was not restricted to the course topic. Students were free to engage and actively encouraged to pursue other areas of learning such as bird identification, plant ecology, or geology, and the Nsasani Science Centre housed an incredible library of field guides and textbooks to utilise. Ultimately, the course aimed to promote a deeper understanding of the natural world through the study of reptiles.

CHANGING PERCEPTIONS

A successful course makes information accessible and helps students move toward a place of better understanding. Reviews from several students on the course highlight the impact of RDAS and act as motivation to continue the work in the coming years.

'There is something unique and special about seeing and physically holding the animals you already see on TV or in pictures. There is a newly profound bond and respect spark that has arose in me and it is all thanks to this reptile diversity course.'

'My view about reptiles has changed a lot. Before, I used to see reptiles as small animals that needed to be killed when found associated with human habitats. For example, if I'd came across a snake, whether it's venomous or not, I would kill it. But now, I know how to identify if a snake is venomous or not so to avoid it from getting to close from human habitation.'

'In the beginning of the course, I was scared of reptiles but all of that changed because I can now hold reptiles. Through lecture classes, my view about reptiles has totally changed and I've developed

so much love for reptiles. I now have a better understanding of them.'

'At first I hated reptiles. I didn't want anything to do with them. I used to kill geckos which were moving on the wall. Now I think reptiles are cool and harmless if not provoked. So, I will no longer kill them. I think I am starting to like them. They are amazing.'

'My view of reptiles has changed in such a way that I am now able to classify each reptile to the family it belongs and no longer say everything is just a type of reptile.'

COURSE SPONSORS

The 2017 field course was made possible due to the generous support from Nsasani Trust, Organisation for Tropical Studies, the University of the Western Cape, Herpetological Conservation International, Comair Limited, the African Snakebite Institute, and several private donors.

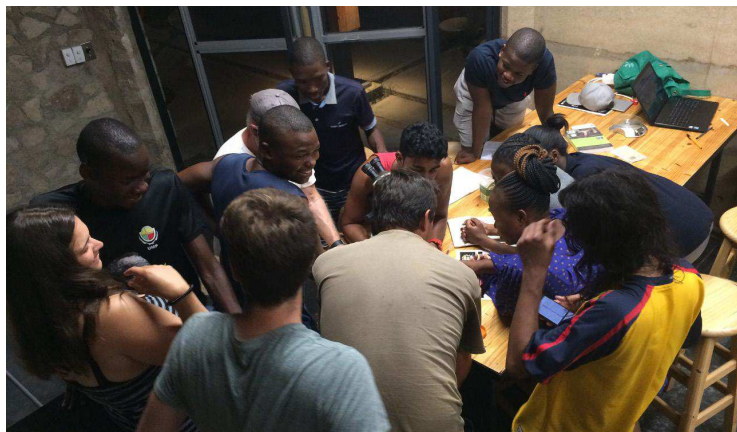


University of Mpumalanga students with a rain frog that was captured in a pitfall trap. UWC

LOOKING TO THE FUTURE

Planning for the second annual Reptile Diversity in African Savannas field course is now underway, and the course is scheduled to run from 2 December to 14 December 2018. To learn more, visit our webpage at www.studyafrikanreptiles.org, and be sure to follow the progress of the 2018 course on Twitter, Instagram, and Facebook.

Bryan Maritz founded the Reptile Diversity in African Savannas field course. He is a senior lecturer in the department of Biodiversity and Conservation Biology at the University of the Western Cape where his research focuses on the ecology of snakes. Robin Maritz manages the Reptile Diversity in African Savannas field course. Her current research focuses on the trophic ecology of snakes.



RDAS students learning how to identify reptiles based on morphology. UWC