Succulent Karoo Research Station

Symposium 30.-31st October 2025

25 Years Studying Small Mammal Socio-Ecology in a Biodiversity Hotspot

Draft Program and Abstracts Version 26. January

Day 1: Science

Time	Topic	Presenter
9:00	History of SKRS	Dr. Carsten Schradin, SKRS and CNRS
10:00	SKRS in a South African context	Prof. Neville Pillay, SKRS and Wits
10:30	**Coffee Break**	
11:00	Why to live solitarily: Lessons from the bush Karoo rat	Dr. Lindelani Makuya, SKRS and CNRS
11:30	Socio-genetics and conservation	Dr. Chantal Poteaux, University Sorbonne Paris Nord
11:45	Socio-genetics of small mammals in Goegap	PhD student, University Sorbonne Paris Nord
12:00	**Lunch break**	
13:30	Lodge ecology	Student SKRS
14:30	Engineering Ecosystems: How Bush Karoo Rats Influence Soil Carbon Sequestration	Dr. Christine Hatté, Université Paris-Saclay
15:00	BKRs as ecosystem engineers	Student SKRS
15:30	**Coffee Break**	
16:00	The acoustic network of the African striped mouse	Prof. Nicolas Mathevon, Univ. Saint-Etienne
16:30	Harshness is not stress: Lessons from the striped mouse	Dr. Carsten Schradin, SKRS and CNRS
17:00	**End of Day 1**	
17:00 – 18:00	Visit of the Succulent Karoo Research Station and the field site. Maximum of 12 people.	

Day 2: Conservation

Time	Topic	Presenter
9:00	SKRS and Goegap	Maxie Jonk, Reserve Manager Goega,
10:00	Basic science and nature conservation	Dr. Neville Pillay, SKRS and Wits
10:30	**Coffee Break**	
11:00	Succulent Karoo as a biodiversity hotspot	Representative of a conservation organisation
11:30	Biodiversity monitoring by SKRS	SKRS manager
12:00	**Lunch break**	
13:30	Conservation of reptiles in the Succulent Karoo	Johan Marais African Snakebite Institute
14:30		
15:00		
15:30	**Coffee Break**	
16:00		
16:30		
17:00-18:00	Visit of the Succulent Karoo Research Station and the field site. Maximum of 12 people.	
18:30	**Braai at SKRS**	

Abstracts

Carsten Schradin
Succulent Karoo Research Station
IPHC, UNISTRA, CNRS, 23 rue du Loess, 67200 Strasbourg, France
School of Animal, Plant & Environmental Sciences, University of the Witwatersrand, Private Bag 3, WITS 2050, Johannesburg, South Africa
*E-mail: carsten.schradin@iphc.cnrs.fr

History of SKRS

The Succulent Karoo Research Station SKRS was founded in 2001, when I started my field work on striped mice (*Rhabdomys pumilio*) as a postdoc at the University of the Witwatersrand. Originally, only short field studies were planned to show that paternal care occurs in striped mice under natural conditions. However, I immediately realised that this is the perfect place for long-term field studies on a mouse like rodent, which changed my career path. 40% of all mammals are rodents, most mouse like, but my study is the only one on a free-living mouse that is observed directly in its natural habitat. In 2006, I started a contract position as group-leader at the University of Zurich, Switzerland, and in 2012 as permanent researcher at the CNRS in Strasbourg, France. In 2013, SKRS was registered as a South African non-profit organisation. Long term studies on the striped mouse continued throughout the years. Studies focussed on paternal care, social flexibility, and adaptations to drought with about 100 peer-reviewed publications revolutionising our understanding of social evolution and of

adaptation to drought. The closure of Goegap Nature Reserve in 2020 due to the Covid pandemic lead to change of research focus from the socially flexibly but most often group-living striped mouse to the socially flexible but most often solitary living bush Karoo rat. These studies revolutionised our understanding of the mechanisms leading to and the evolutionary consequences of solitary living. Over the 25 years of field studies at Goegap, more than 130 volunteers and research assistants from all over the world worked at SKRS, 20 master students, nine PhD students and eight postdocs collected data for their projects. Multiple collaborations were done with researchers from France, Germany, South Africa, Spain, Switzerland, UK and USA. Since 2024, three research assistants are employed by SKRS. Striped mice from Goegap were exported the first time in 2006. In the meantime, four colonies exist at research institutions worldwide, in France, the UK, and the USA, with a wide variety of studies such as vocal communication, molecular and neural basis of social behaviour, chronobiology and evolutionary developmental biology (evodevo) being conducted on them, all based on our results obtained at SKRS. In sum, the research conducted at SKRS over the last 25 years had a significant impact on multiple research fields and impacts research worldwide.

Christine Hatté
Université Paris-Saclay, France
*E-mail: Christine.Hatte@lsce.ipsl.fr

Engineering Ecosystems: How Bush Karoo Rats Influence Soil Carbon Sequestration

The role of Bush Karoo Rats in shaping ecosystem dynamics, particularly in soil carbon sequestration, remains poorly understood. While their lodges are expected to provide protection against predators and weather, their potential impact on soil health and carbon dynamics has received little empirical attention. Bush Karoo Rats' constructions significantly influence their surroundings including soils by concentrating organic matter, such as wood, vegetation, and feces. This addition of carbon to soil might (i) enhance biodiversity by creating favorable conditions for plant species unable to thrive in nutrient-poor soils, and (ii) contribute to a sustainable soil carbon reservoir. However, robust data to support these dynamics remain scarce. This study presents preliminary results from soil core samples collected at the Succulent Karoo Research Station in November 2024. Soil cores were sampled in paired settings: under lodges vs. outside under the same shrub species without lodge (*Zygophyllum*, *Lycium*) and unvegetated areas. Lodges had been occupied for varying durations (inc. abandoned lodges). Using isotopic geochemistry, we analyze soil organic matter through ^{14}C dating, carbon and nitrogen content, and isotopic signatures. $\delta^{13}C$ reveals the contributions of C3 and C4 plants, while $\delta^{15}N$ provides insights into the role of legumes in nitrogen cycling. The objectives are threefold: (i) quantify the carbon stock added by lodges, (ii) evaluate its sustainability, and (iii) identify factors influencing the magnitude of this additional carbon stock. These findings aim to inform conservation policies by emphasizing the overlooked role of small mammals in carbon cycling and soil health.

Carsten Schradin
Succulent Karoo Research Station
IPHC, UNISTRA, CNRS, 23 rue du Loess, 67200 Strasbourg, France
School of Animal, Plant & Environmental Sciences, University of the Witwatersrand, Private Bag 3, WITS 2050, Johannesburg, South Africa
*E-mail: carsten.schradin@iphc.cnrs.fr

Harshness is not stress: Lessons from the striped mouse

Animals are adapted to cope with harsh environments characterised by persistent and long-lasting factors that threaten homeostasis and survival such as reduced food (energy) availability, reduced water availability, and seasonal cold or heat. Understanding these adaptations is crucial to understand species resilience to global change. Over two decades of field studies I investigated how African striped mice (*Rhabdomys pumilio*) are adapted to harshness in the Succulent Karoo semi-desert characterised by hot, dry and food restricted summers and moist benign winters. I found that striped mice are adapted to harshness via multiple behavioural and physiological mechanisms, which aim to reduce energy consumption and increase water retention. Mechanisms include social flexibility, communal huddling, sun-basking, reducing activity, broad range of blood glucose regulation, decrease of metabolic hormone levels, decrease of resting metabolic rate and by this an overall reduction of daily energy expenditure. These studies indicate that to endure harshness, animals decrease energy expenditure, which is the opposite to the physiological stress response which is characterised by a significant increase in energy expenditure. Harshness requires coping mechanisms reducing energy expenditure. Measuring the same traits in species from mild climates might help us predict species resilience to a changing world where droughts will occur more regularly. It is important to recognise that stressful environments are not synonymous with harsh environments. I thus conclude that the harshness response is different from a stress response. The stress response leads to increased energy expenditure to overcome stress, while the harshness response leads to reduced energy expenditure to endure harshness.