

FSM-TIMES

Nr. 2, January to March 2005

Four Striped Mouse

Title

The Striped Mouse

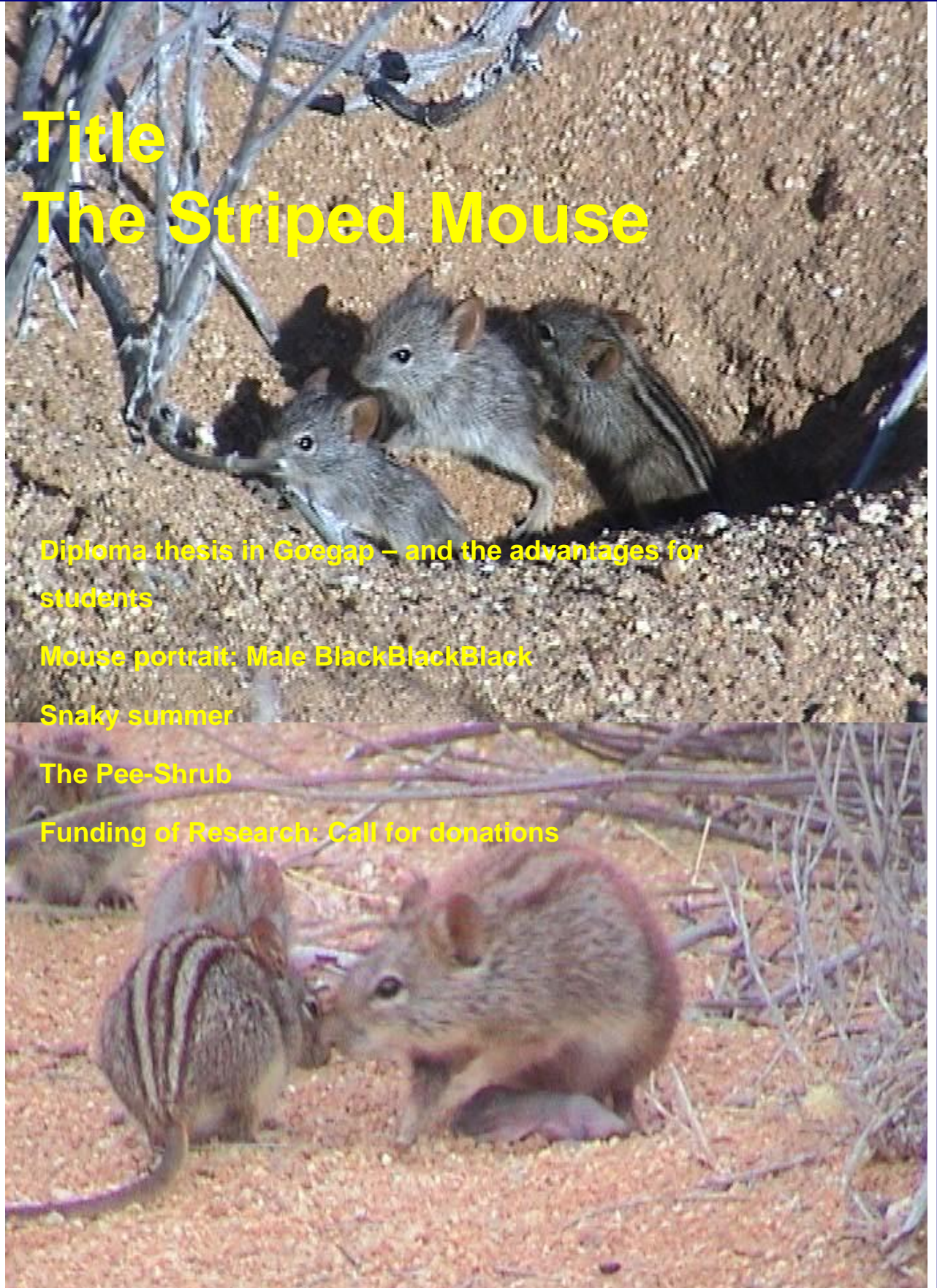
Diploma thesis in Goegap – and the advantages for students

Mouse portrait: Male BlackBlackBlack

Snaky summer

The Pee-Shrub

Funding of Research: Call for donations



EDITORIAL

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WELCOME: THE SECOND ISSUE OF THE FSM-TIMES!



To get the first issue of the FSM-TIMES running was harder than I thought. Writing the articles was easy, but formatting the text and getting it into an acceptable pdf was

surprisingly time consuming. And then something happened which I thought never really happens: Most of the emails sent out were not received! But finally the FSM-TIMES and its German sister, the SGM-Spiegel was sent out into the world.

But was it worth all the effort? In the first issue of the FSM-TIMES I had stated two aims:

1. To provide information about our work at the Succulent Karoo Research Station and the research on small mammals. We aim to provide you with entertaining scientific information, that would be enjoyed by everyone interested in nature, and not only (but also) by scientists.

2. To obtain funding for smaller scientific projects from donations of the FSM-TIMES subscribers.

In the meantime, more than 80 people from 20 countries subscribed. Thus, the first aim has been already met. I think you and all the other subscribers make it worthwhile producing the FSM-TIMES.

However, of the more than 80 subscribers, only 4 did not get an email regarding the FSM-TIMES from myself. Clearly, there must be many people out there I do not know that are interested in nature, rodent

social behaviour, ecology and evolution. I did my homework, as proven by >80 subscriber. But I would like to ask you once more to send the FSM-TIMES or the link to the homepage where it can be downloaded

(<http://www.stripedmouse.com>) to all other people that might be interested. Let's make our goal to have at least 200 subscribers for the next issue!

When one looks at the subscribers from the different states, one easily notices' that some are clearly underrepresented, especially the USA; but also the UK, France and Italy. Maybe for people from the USA and UK the poor-poor¹ English of this newsletter makes it hard to read?

Country	SGM-Spiegel Subscribers	SM-TIMES Subscribers
Australia		2
Argentina		1
Belgium		1
Benin		1
Canada		1
Columbia		1
Congo		1
Germany	21	
France		2
Italy		1
Namibia		1
Netherlands		2
Peru		1
Phillipines	1	
Switzerland	9	2
South Africa	1	23
Sri Lanka	1	
UK		3
USA		5
Zambia		1
unknown		5

However, I would like to appeal to the people of those countries to take part in the race and improve their countries share on subscription. The second aim was to collect donations for research. As no bank accounts were available yet, this was not possible so far. This lead to some confusion and disappointment, as many people immediately wanted to contribute. I got several emails asking for banking details and it was difficult for me to keep one lady in Springbok from putting bank notes into my pockets. But the good news is that now you can contribute. Of

course subscription to the FSM-TIMES is free and for many subscribers, like from South American and many African countries, it is not possible to donate. But donations from all others are warmly welcome (for more details see below). I hope with this issue of the FSM-TIMES you'll get something back for your money.

Kind regards,

Carsten Schradin

THE DIFFERENT PLACES AND LOCATIONS

South Africa

As the name says, it is the most southern country in Africa. South Africa lies at the Cape of Good Hope. The population of South Africa (40 million) consists of black South Africans (e.g. the Zulu) which represent 75% of the population. 12% are white, 8% coloured, and some are Indian, Malaysian or descendents of the San (bushman). South Africa is the only industrialized country in Africa with a very good infrastructure.

Succulent karoo

It describes a special vegetation type. It receives low rainfall in winter and is characterized by dwarf succulent shrubs and an amazing wildflower display in spring. It is a desert to semi-desert environment. Succulent karoo is found in Namaqualand and southern Namibia. In the FSM-TIMES, the words succulent karoo and Namaqualand are often used as synonyms.

Namaqualand

It is situated in the northwest of South Africa, between Cape Town and Namibia. Famous for its wildflower display in spring, Namaqualand was one of the world's most important copper mining areas at the beginning of the 20th century. Nowadays the diamond mines are more important. Because of its dry desert like climate, agriculture is mainly absent and population density low. Namaqualand is part of the Northern Cape Province.

Springbok

It is the capital of Namaqualand. Although Springbok has only around 20 000 inhabitants, it has shops for nearly everything, including two well stocked supermarkets. At weekends Springbok is very busy, when all Namaqualanders come here to do their shopping.

Goegap Nature Reserve

Pronounced as "Guchap", this nature reserve lies only 20kms outside of Springbok. In spring it is visited by thousands of tourists that are attracted by its wildflower display. During other times of the year it is very quite and mountain zebra, gemsbok, springbok, aardwolf, mice and mice researchers live in peace.

Field Site

This is the place in nature where the scientist collects his data. So our field site is where we observe the mice

SPRINGBOK – THE CAPITAL OF NAMAQUALAND

By Melanie Schubert

The bus was driving slower and a soft rattling woke me up. Still sleepy I opened my left eye, juts in time to read the sign “Welcome to Springbok”. Finally I got here, and full of curiosity I was watching with wide open eyes what there was to see. Looking out of the window, I soon felt disappointed and a bad feeling developed in my gut: This little town surrounded by brown hills seemed to be nothing else than a 1km long main road. Where were the African colours in this dry wilderness?

However, soon I realized that I had misjudged this little town enormously. Within a few days I found out that Springbok has a lot to offer. The people are quiet but friendly and extremely helpful. Springbok, its original name was Springbokfontein, started as a simple farm. The reasons for its

development into a town lie in the 19th century, when copper was found in Namaqualand. In 1852, Philip and King opened the first copper mine and the little farm was soon developing into an ever growing village. Nowadays this village is a town and the capital of Namaqualand. It is the centre of administration, trade and (very little) industry for this region. Here you will find two big and well stocked supermarkets and shops for nearly everything. Springbok has also historic attractions for tourists. You can visit old mine shafts, graves from the “Anglo-Boer war” and the oldest melting furnace in Southern Africa. Furthermore, the Namaqualand Museum gives you an insight into the history of Springbok. If you are interested in animal and plant life, you will find a heaven on earth, especially in spring. This is the time when hundreds of wildflower species cover the land with spectacular colours and young antelopes make their first experiences of life.

In the next FSM-TIMES you will learn more about Namaqualand with the title: HOLIDAY AND TRAVEL IN NAMAQUALAND.



Main street in Springbok.

LETTERS

Please tell us your opinion about the second issue of the FSM-TIMES.

Your mail has been received and I can only wish for the success of the same program. I wish that with time it will grow to cover other areas of the African continent especially the Zambezi region that is very rich in biodiversity, and I further hope that I may be able to contribute *favourable* to sharing FSM TIMES with more interested groups.

Mathias Kawalika M.Sc., Ndola, Zambia.

Congratulations on your new publication - FSM-Times. Being an editor can be lots of fun (except just before the deadline). I wish you success in building the Succulent Karoo station.

Dr. Barbara Blake, Editor of the Journal of Mammalogy

I received the newsletter through ASAB and enjoyed it very much - you have done a very good job on it.	Very, very groovy newsletter....the striped mouse grows in fame and hopefully the research program grows in fortune....
Dr. Craig Roberts, Liverpool	<i>Dr. Devi</i> Stuartfox, Johannesburg, South Africa

NAMAQUALAND-WEATHER

by Carsten Schradin

The last three months	October	November	December
Minimum temperatures			
night	10	12	14
day	16	21	27
Maximum temperatures			
night	20	25	22
day	33	36	36
Rainfall in mm	22.5	0.2	0
Days with rain	4	2	0

Although we received some rain in October, November and December it was very little. Together with a relatively dry winter, this had consequences on the vegetation. Goegap became very dry again, most of the annual plants have died and the plant cover is very low. Only the shrubs and some succulents remained. However, for a small animal like the striped mouse there is still enough food, but the coming months will be rather tough. But in how far the drought will be a problem for them will be decided in autumn: When the first rain comes in March, it will be fine. If not, there will be a

severe problem for the animals in Goegap.

The temperatures were normal, but we had some very hot periods. Especially in November there were two weeks with temperatures far above 30 degrees every day. Fortunately, afterwards a cold front came from the Atlantic. Also the beginning of December was pretty hot, again followed by a cold front. It was so cold, that we even had to wear a jacket in the morning when doing nest observations. Still, it was warm enough to have a lovely braai (=BBQ) on Christmas Eve.



The field site in December: It got very dry again.

THE PEOPLE IN GOEGAP

By Carsten Schradin

The last three months were very busy. Melanie, Christina and Carola finished their data collection for their diploma theses. After six months of hard field work it became evident that three very good projects had emerged. They left middle of December and are currently writing up their theses in Germany. In one of the following FSM-TIMES we will publish summaries of their work. Such a large amount of data could only be collected because the diploma students got significant help from the field assistants. In the last

three months they were Annette Wiedon from the University of Münster and Eva Kraus from the University of Erlangen (both Germany). Annette was very helpful, always willing to help with all aspects at the research station. This was not only of benefit for the data collection, but also for the student's kitchen. The hills and mountains of dirty dishes started to disappear and after some time one was able to see the bottom of the kitchen sink again. Annette spent the nights with Christina trapping small mammals at

10 different sites in Goegap, while she radio-tracked mice during the day, conducted plant surveys and observed mice at their nest. At the end she had her own little project, trapping round-eared elephant shrews along a dry river bed next to the field site. Although population density was low and so was trapping success, the pilot study revealed that there are enough elephant shrews living for a potential larger study in the future.

Eva radio-tracked several mice to determine their home ranges, assisted with trapping and observing the mice. She conducted two important pilot studies: She trapped

mice at a neighbouring farm and – after several disappointing days – finally found a viable small population, which could be included into future studies. She also measured temperature in mouse dummies (copper tubes covered with mouse skin) at natural basking sites of mice. The models warmed up by 7 degrees more than the ambient temperature, and this effect was even stronger when piloerection was simulated (by brushing the mouse skin the wrong way with a toothbrush). It appears that basking in the sun could be a good strategy to warm up passively and to save energy.



Field assistants: Annette Wiedon (left) and Eva Krause

MAKING A DIPLOMA THESIS IN GOEGAP –ADVANTAGES FOR STUDENTS

By Carola Schneider

When the end of your studies is near you will question yourself where to make your diploma thesis. For me it was easy to answer this question as I had made a practical training as field assistant for 8 weeks in Goegap in year before. After making this decision I had to face reality. I had to organize some money for the diploma thesis myself, I had to organize the journey to South Africa, I needed a visa and I had to stay for months far away from home. So what advantages do you get? While organising many things in my home country Germany, I realized that it is important to apply for several permits and letters from the University, the government, the doctor and so on in a very short time. This is hard work diploma students in Germany do not have to bother with, but it is an important exercise if you want to work as a scientist later. Another important experience is to apply for research money at foundations so you can finance part of your diploma thesis, as you won't get money from German universities to do a diploma thesis abroad and South African universities are not keen on financing the thesis of a Germans student. So you have to write applications and that's a good exercise for work as a scientist later. When you arrive in Goegap you have to write your diploma thesis, organise and improvise, work in a team and you need to be flexible in all parts of life. From all over the world scientists come to visit Goegap and you have the possibility to get an

How to become a field assistant? Only people with a biological background can become field assistants. These are students of biology, veterinary medicine or related areas. The work of field assistants includes: radio-tracking, trapping and marking of small mammals, behavioural observations, work at the research station, including maintenance, and much more. People interested in working as a field assistant for 2-3 months write an email to info@stripedmouse.com. Please write a short motivation and attach a CV. You will then obtain more information.



insight into other research fields and to exchange your experiences. People in Namaqualand speak only English and Afrikaans so here you will have to communicate in English. This is also an advantage because most scientific publications are in English and nowadays even in Germany diploma theses are often written in English. Besides this you get an insight into the life of the people of Namaqualand and there is the possibility to make some trips to discover the fascinating landscape.

Of course working in Goegap is physically hard and you need a lot of patience. But after walking home after a hard day in the field you can sit at the open fire behind the house

A GOEGAP EXPERIENCE

By Brigitte Britz

In the previous issue you were told about the outlay and day to day functioning of the research station. Some people prefer the easy life where everything is available, accessible and fast. Goegap is quite a different story and for some people it could be a drag and for others an adventure, depending on how you see it. You were told that there is no electricity, telephone or fresh water. Quite primitive, but somehow if you think about it, you don't really need all these fancy things.

We have solar power for the lights, batteries to run the computers, drinking water from the office (about 5kms away) / bottled water (from Springbok). We get some underground water for showers, we have gas for the geyser and the stove and to be quite frank, there is really no difference, whether you shower with water heated by gas/ electricity, and a meal prepared with gas do taste the same as one prepared on an electric stove (in fact, famous chefs cook on gas stoves).

There is no telephone here so therefore you either have to go to the office to make phone calls or go once a week to Springbok to receive/ send emails. For some people it is a hassle. However, for us a ringing phone is not a pain in the neck, but a

and look at the wonderful sky...isn't this enough to make working in Goegap Nature Reserve a real pleasure?

phone call/ email once/ twice a week is something exiting to look forward too.

In return for the "inconvenience" you experience in Goegap it also offers its visitors some amazing experiences. Some one you could treasure for a lifetime and also use it as a learning experience. There is so much to see and learn here. Getting up early in the morning is a drag (its hard at first especially if you have to get up at 5.30 am) but to smell the freshness of the morning and watching how the earth and everything around you comes to life, makes it a worthwhile experience. While doing nest observations in the evenings, you could suddenly spot some "shy" animals you don't normally observe so easily like the mountain zebra or an African wild cat. Even for people not studying science, it is amazing to observe how many characteristics these small mammals seem to share with humans, and these little guys often make our day. An example would be of female 560 who wanted to hitch a lift with Carsten to the office but unfortunately was discovered on the passenger seat before Carsten could leave the station, or the pygmy mouse who joined the Christmas braai (BBQ) and had its own piece of meat, which was twice the size of the pygmy mouse, or the striped mouse who would run up to you in the afternoons when she doesn't see

any peanut butter in front of her nests. (During the breeding season a small amount of peanut butter is placed on a scale in front of the nest to weigh the females and as such determine if they are pregnant or already gave birth). The amazing bright stars in the crisp cold evenings of winter or the warm summer evenings would entice any star watching amateur and not to mention watching a movie under the clear sky while having a braai and afterwards

falling asleep on a mattress on the ground. (Hopefully you would fall asleep soon as possible and thus not think of all the possible creepy crawlies that might want to share your bed with you!)

This is just to mention a few things one could experience in Goegap. Unfortunately, we cannot email/ mail this experience to you; you would have to come here to experience it yourself!

TITLE: THE STRIPED MOUSE

IDEAL MODEL TO STUDY PATERNAL CARE, REASONS FOR GROUP LIVING AND SOCIAL FLEXIBILITY

By Carsten Schradin

Distribution and Characteristics

Apart from humans, the striped mouse (*Rhabdomys pumilio*), also called the four-striped mouse or even the four-striped grass mouse, is probably the most common mammal in Southern Africa. Its distribution ranges even within East Africa, where it is mainly restricted to high altitudes, e.g. Mt. Kilimanjaro in Tanzania. This species is so wide spread, because they can live in a wide range of different habitats: Green and moist grasslands, the Kalahari and the Namib desert, karoo and succulent karoo, mountain areas and even at the edge of forests. It got its name from four dark stripes on its back, separated by three lighter, sometimes even white

stripes. The basic colour is brown that ranges from very light to very dark. However, geographical differences in brown darkness might be due to environmental, not genetic differences. For example striped mice in the succulent karoo are much darker than in the grasslands of KwaZulu Natal, but in captivity there is no difference. For a mouse species the striped mouse is medium sized, about 30-40g as adults, although large individuals can weight over 80g, in captivity even more. As such, it is about double the size of a house mouse. However, in contrast to this species the striped mouse is diurnal, being active during the day. In winter mice are active during the entire day, while in summer the mice

rest during the hot parts of the day and are mainly active during the morning and late afternoon. The striped mouse is the only species of its genus *Rhabdomys*, although recently it had been proposed that it actually consists of two sister species, one inhabiting the arid areas of the east and the other one the moist grasslands of the west. There are clearly genetic differences between these populations, which is not surprising as they are more than 1000kms apart from each other. However, in how far these differences justify the nomination of a new species is still under debate.



A female carries her young to the new nest.

A group living solitary forager in the succulent karoo

I had done my PhD thesis about paternal care in New World monkeys. I thought this is a very interesting topic, but primates are an

expensive model where it is difficult to get good sample sizes, especially when working in the field. As I found some evidence in the literature that the striped mouse might show paternal care, I came as a postdoc to South Africa to investigate this. I soon found out that this species is in fact highly paternal, with males showing the same parental behaviour patterns as females and to the same extent, with the obvious exception of nursing. However, this was in captivity, and could have been an artefact of the unnatural conditions under which the animals had been kept. In fact, the striped mouse had been studied for decades in the moist grasslands of South Africa, and seemed to be a solitary species. Males were thought to search for females to mate with them, but not to participate in parental care. However, as the striped mouse occurs in many different habitats, I decided to study it in the wild in a habitat very different from the moist grasslands: In the succulent karoo, a semi-desert to desert in the North West of South Africa. As study site I chose the Goegap Nature Reserve near Springbok, because another scientist, Tim Jackson from the University of Pretoria, had studied whistling rats there and reported that striped mice are common in this reserve.

The results I got within five months were astonishing, at least I was very surprised by what I found: One of the most complex and interesting social systems described for a rodent. The mice were group living here. They shared one nest in a shrub and in the morning I could see up to 30



A group of mice are basking in front of their nest. We mark mice individually with hair dye. Colours at the back indicate males, at the front females. In front you see male 33 and female 23.

adult mice of both sexes leaving their nest, basking in front of it. They interacted highly amicably with each other, sitting in body contact or grooming each other. Then, after about 20-30 minutes of basking in the sun, they left. Not as a group, but every mouse into another direction. During the day they were foraging alone, and met again during the late afternoon at their nest. Here they greeted each other by sniffing at each other and they basked in the sun, before withdrawing into the nest. When two mice met during the day, they did not pay much attention to each other when they were from the same group. However, when the

mouse was from another group, it was chased away aggressively. Males were especially aggressive against other males, while females chased males as likely as females. Mice were highly aggressive when they encountered a stranger that was smaller than them, while a bigger mouse at the territory boundary was not attacked. However, in front of their nests strangers even double the size were immediately taken care of and chased out of the territory.



A wild male (right) takes care of a pup that has been experimentally presented to him in front of his nest. One juvenile male (front) is also interested, while two more juveniles (back) are watching from a distance.

Communal nesting and paternal care

Groups typically consisted of one breeding male and up to four breeding females. The male was hereby highly sociably, showing as much social interactions with juveniles as females did. They even retrieved pups presented in front of their nest into their nest. Videotaping inside two natural nests indicated that the males were sleeping with the rest of the group, and that they showed parental care in the nest. Thus, our observations of paternal care in captivity were no artefacts, but male parental care also occurs in the field.

A group has 2-4 breeding females. These females originate from the same group, which means they are close kin such as sisters or half sisters, while the breeding male originates from another group. All or most adult females of a group give birth, and often more than 10 juveniles of about the same size can be observed in front of a nest. As a female normally gets only 5 pups, these juveniles must have had at least two mothers. Sometimes a female leaves the group nest to give birth elsewhere and only returns with the pups when those are around 10 days old. But in other cases it seems that more than one female gives



The pups leave their nest (here an abandoned whistling rat burrow) already at an age of 10-12 days, but first only to bask in front of it. At an age of 16 days they leave the nest for foraging.

birth in the same nest and that females rear their offspring communally.

The offspring remains in their natal group even after reaching adulthood. This is the case both for males as well as for females. Interestingly, these offspring normally do not start to reproduce themselves, even when they are sexually mature and the breeding season is not yet over. Both juvenile and adult offspring help in nest construction, territory defence and warming younger pups in the nest. Thus, they can be called helpers at the nest.

Potential reasons for group living

The complex social system of striped mice in the succulent karoo can best be described as a territorial group living solitary forager with communal nesting, paternal care and helpers at the nest. Why did such a complex social system evolve?

There are two reasons for this complex social system: 1. High population density leading to habitat saturation and forced philopatry, and 2. short breeding season leading to the absence of reproductive competition for most time of the year.

High population density

After the breeding season, more than 200 striped mice can live per hectare. This means the territories of groups are very small, only 0.1 to 0.3 ha, or 10x10 to 18x18 meters.

Groups within such territories consist of 8-30 adult mice, and each territory is surrounded by other territories, which are also heavily packed with mice. As mice travel between 300 and 1000 meters a day and because it is such a small area, they often encounter mice from other groups. Such encounters are typically aggressive, and juveniles have only one choice when meeting an adult and thus much larger stranger: Run away as fast as possible! This means, young mice learn very quickly that there is no place where they can go to, they have to stay at home! The stressful encounters with aggressive mice from other groups are also the likely reason why adult offspring do not start to show signs of reproduction.

But why is the population density so high? This is so because the survival probability of mice is extraordinarily high. More than 20% of the mice survive for more than one year. 20% might sound small, but for a small mammal this is very high. The same species in the grasslands has an annual survival probability ten times smaller, with only about 2% surviving for more than one year. And the reasons for this good survivor in the succulent karoo are good food availability and benefits of group living.

The succulent karoo is dry, with only 150mm of rain a year at my field site. Accordingly, plant cover is low. But

in spring after the winter rains most of the land is covered by short living plants, especially wildflowers, but this lasts only for three months.

Afterwards shrubs and succulents dominate the landscape, but a large amount of the soil simply consists of plain sand. So one might think the mice might have a problem to find food. However, although there is not much growing, nearly everything that is growing, is mouse food. Of 51 plant species at my field site, 32 are eaten by the mice. And during spring there is more than enough food available, and the mice get really fat. The heaviest striped mice ever have been trapped at my field site (over 80g, both for males and for females). During the following dry summer they lose 12% of body mass, but that simply means they arrive at a body mass normal for other populations. Then the autumn rains start and new mouse food is growing.

Living in a group has also advantages that increase the survival probability of mice. First they share one nest, and the sleep closely huddled together. Even in summer nights it can get relatively cold in the succulent karoo, down to only 10 degrees, which is not much for a small mammal. In winter frost is common. The mice form a real ball of mice in the nest, warming each other. By this they reduce energy loss and thus save energy themselves. While videotaping wild mice over entire nights in time-lapse mode, I further found out that they are not sleeping very tight. In fact, at least one group member seems to be relatively awake all the time. A mouse nest never gets really quiet,

not even after midnight. This probably serves as a warning system, as the approach of a potential predator is more easily realized when one the group is always awake and serves as a sentinel. The nests are built from hay and are above ground inside shrubs. Thus, they are relatively easily accessible for snakes. While a single (sleeping) mouse might not realize when a snake approaches during the night, a group of several mice with one always awake will easily realize when a predator approaches and flee out of the nest.

Short breeding season

The seasons in the succulent karoo are dictated by the rain that occurs in winter. Winter is pretty cold, with temperatures below 0, which might explain why breeding of the striped mice (and most other animals) only starts in spring. Spring is characterized by a high percentage of plant cover, mainly wildflowers and herbs. In September (spring on the southern Hemisphere), Namaqualand is covered in a colourful coat of yellow, blue and orange, the colours of hundreds of species of wildflowers. However, this richness is of short duration, and in November the country turns desert again. The short season of the plenty determines also the breeding season of the mice. The breeding season is only 3 months long, enabling females to get 2-3 litters (interbirth interval minimum of 23 days). Mice get sexually mature when they are only 6-8 weeks old and have a body weight of 25g, although they still grow for several weeks until they

reach a body weight of 40-50g. However, in the succulent karoo this means that when a mouse gets sexually mature, the breeding season is nearly over. Habitat saturation forces them to stay at home. At the end of the breeding season, when most mice born during that year are still juveniles, reproductive competition between group members reaches zero. As the breeding season is terminated, nobody breeds, and there is no potential for competition over breeding status between group members. Thus, at this stage staying in the natal group is not associated with any costs or conflict due to reproductive competition, but mice can enjoy benefits of group-living.

One reason why juvenile and adult offspring staying at home show helping behaviour is simply because this comes at no great costs. Helping to build a nest means they also build their own nest, and warming and huddling pups during the night means at the same time they warm themselves. So far we do not know whether helpers increase their time in the nest during the day when pups are present, which would be a real cost. Defence of the group territory and nest is clearly a dangerous behaviour, but again the individual itself benefits directly. Thus, helping behaviour of striped mice can to a large extent be explained by direct individual benefits.

Similarly male parental care can be explained by its low costs. Males are associated to groups of 2-4 breeding females. They monopolize these groups by aggressively chasing away all strange males from their territory. Neighbouring groups of

communally nesting females are defended by other males, and no male can defend more than one group of females. Thus, the male spends all its time at the nest of his group of communally nesting females. And this is where the pups are. As the male is at the same place as the pups, it does not cost him any time to take care of them. His main contribution might be warming the pups, and his presence positively influences the development of pups. He contributes as much as females to raise the pups, the high energetic costs of lactation not taken into account. Males also visit the nest during the day, which might be

costly, as he cannot defend his territory during that time. But the main reasons for paternal care can be seen in its low costs, as males are anyway associated with pups, and its resulting benefit, i.e. improved development of pups.

Other habitats – other habits: The striped mouse in the grasslands

In the succulent karoo, the striped mouse is living in complex social groups. This result was surprising, as many previous studies in grasslands have reported a solitary lifestyle for the same species. However, there was one important



The vegetation of the grasslands in South Africa is very different from the succulent karoo. Although it looks nicely green, there is little food for mice, which cannot digest grass.

difference between previous studies and my study: Other studies totally relied on capture-mark-recapture, i.e. researchers trapped mice, marked them, and looked where else the same individuals were trapped. In contrast, I used direct observations. As in the succulent karoo the striped mouse is group living but a solitary forager, I wondered whether previous studies in grasslands got the wrong impression. Thus, I had to go there and investigate myself.

Of course direct behavioural observations in the grasslands are impossible: the vegetation is much too dense. So I had to find another method to compare the two populations, and the method of choice was radio-tracking. Mice got some radio-transmitters on, and we determined their home ranges. The question was whether several mice overlap their home ranges, i.e. form groups, or have exclusive home ranges. We intruded even more into their privacy and radio-tracked them at night, to see whether they were sleeping alone or in groups.

To work in the grasslands I went to Kamberg Nature Reserve in the Drakensberg mountains of Kwazulu Natal, South Africa. This is more than 800km away from Goegap as the jackal buzzard flies, but for my car it was more than 1300kms. It was exciting to live for some months in a habitat that is totally different from Goegap. It was summer and raining nearly every day. The vegetation was flourishing, everything was green.

One should think such a green land must be a heaven for the mice, but it is not. Mice are not cows, they

cannot digest grass! Instead they feed on grass seeds, herbs and berries, and this food is widely distributed and sparse. This might explain our surprising results from radio-tracking: The territories of females in the grasslands were 6 times larger than those of females in the succulent karoo. Furthermore, this territory was not shared with any other mice and the females normally slept alone. Only sometimes they were visited by a male, but only for a few nights, not permanently. The males had even larger home ranges than the females. Their home ranges overlapped those of several females, and they visited one female after the other, probably for mating. So our study confirmed the results of other researchers: The striped mouse in the grasslands is solitary!

Social flexibility also in the succulent karoo

We suspected high population density due to a high survival probability and the short breeding seasons as the reasons for group living in the succulent karoo. In contrast, population density in the grasslands is much lower, only around 10 mice/ha compared to 40 mice/ha in the succulent karoo at the start of the breeding season. This is because the annual survival probability of 2% is ten times smaller than that of the succulent karoo. Also, while the breeding season in the succulent karoo is 3 months short, it is 7 months long in the grasslands. So all of this fitted nicely into our explanations.

But as scientists we would have liked to test some predictions. Our

predictions would have been that when we get the same situation in the succulent karoo as in grasslands, the social system of the mice should change. More precisely: Low survival probability and resulting low population density in the succulent karoo would resemble the situation in grasslands and lead to a solitary mouse lifestyle.

When I came back to Goegap in 2003, it was not my intention to test these predictions. I had marked more than 200 mice the year before and studied 9 social groups. I was anxious to see how these groups had developed. Would the females born in one group in 2002 stay together in 2003 and form communal nests? What factors would determine which females stay together, which leave? Who had survived? Would the males emigrate into other groups? What happens to males that do not find a group?

I soon found out how my study groups had developed: They were all extinct! Of the more than 200 marked mice, only 4 had survived. The winter of 2003 experienced the severest drought in recorded history (since 1960), most mice had died. It was totally dry, no mouse food was available, and the few survivors were just skin and bones. Finally, we got rain at the end of winter in August, and plenty of it. After the rain, icy cold air was coming from the Antarctic, it was freezing every night. As a consequence, every second of the few survivors died in the cold.

My situation was frustrating and depressing. Nearly all my study animals were gone. What to do? After I had relaxed and send my

depressions over the mountains, I realized that this catastrophic disaster enabled me to test the prediction whether low population density leads to a solitary lifestyle. I expanded my field site from 3 ha to 40ha, and by this managed to trap enough mice to study them.

The results were clear. In 2003, all the females in the succulent karoo became solitary, and so did the males. Like in the grasslands, the males had now much larger territories than females, and they overlapped the territories of several females. The males were no group members anymore, but visited one female after the other. Now after the drought, the home ranges of the mice increased significantly. They were much larger than in previous years in the same area of the succulent karoo. In fact, they were the same size as the home ranges of mice living in the grasslands. The drought had minimized survival probability, reduced population density and changed the social system from group to solitary living.

And the second factor, the duration of the breeding season? Like in other years, the breeding season was again only 3 months long in the succulent karoo. If the lack of reproductive competition due to a short breeding season would favour group living, one would predict that groups form again. And this is exactly what we observed. At the end of the breeding season family groups established again. As the population density at this stage was much lower than in previous years and even lower than in grasslands, this also indicated that it is not only the population density alone that

dictated the social system: The presence or absence of reproductive competition is itself an independent important factor.

Future studies

The striped mouse shows extraordinary flexibility in its social system both between as well as within populations. Thus, it is an ideal model to study reasons for group living and social flexibility. In the future, our research will focus on following questions: 1. In how far is the social flexibility adaptive, i.e. leads to higher reproductive

success? 2. How does a mouse determine which social strategy to follow, when to live in a group and when alone? 3. In how far is the social behaviour of a mouse influenced by the social environment it is growing up in? 4. What proximate mechanisms, especially endocrine factors, enable social flexibility? What hormones play a role?

Thus, our main research focus is on the reasons of group living. Hereby we also want to pay special attention to the role of males and understand under which (ultimate and proximate)



The striped mouse is an ideal model to study highly interesting aspects of social behaviour: Paternal care, communal nesting, group living and social flexibility. However, simply to study their individual live histories is extremely interesting and it is astonishing to see how individuals have different characteristics and maybe even characters.

conditions paternal care is shown.

Why research on the striped mouse?

There are many open questions, but the main question might be: Why do research on striped mice at all? Why spend so much time, energy and money for studying the social behaviour of such a small rodent in southern Africa? There are three good reasons why to do so:

1. This research and its results are very fascinating. For many people, the results are interesting and they are surprised to learn about how complex and complicated the life of such a small mammal can be. Behavioural biology as such is a kind of and contribution to our culture, as are the arts. Many people like to go to the opera, just as many people are interested in nature. Here it does not matter that not everybody goes to the opera or is interested in nature, but it matters that many do.

2. The striped mouse is a very good system to understand human behaviour. One might say that to understand humans one should better study their closest relative, apes and monkeys, and compare them with us. However, the mice share one characteristic with us that most primates do not have: Social flexibility. Most primate species have a relatively fixed social system, such as living in family groups (titi monkeys and gibbons), harems (colobus monkeys and gorillas) or in multi-male multi-female groups (baboons and chimpanzees). In

contrast, humans are very flexible. In our species you find monogamy, polyandry and polygyny. People might live in small nuclear families or in extended ones, in small groups, or alone. No other primate has this social flexibility, but the striped mouse has. E.g. like in humans, some males are good fathers, others leave the mother which has to raise the offspring alone.

3. The striped mouse offers an ideal system to study the influences of the environment on social behaviour and what physiological factors are associated with this. Humankind is exposed to an ever changing environment, mainly being changed by ourselves. Thus, we should be lucky to have an animal model that enables us to study the consequences – an animal that lives a few years, not decades, such that we can obtain the results in a relatively short time.

However, my main motivation to study these animals is simply that it is fascinating. What we observe in Goegap is a soap opera of the most exciting kind. Every individual has its own life history, experiences good and bad times during its life. We are often astonished how similar the mice are to us. Of course it would be wrong to humanize the mice, but their life histories are nevertheless interesting. From now on we will publish in every FSM-TIMES the life history of one individual (see below). You can decide for yourself whether these mice have interesting lives or not.

Published and accepted papers

- Schradin C, 2004. Territorial defense in a group living solitary forager: who, where against whom? *Behavioral Ecology and Sociobiology* 55:439-446.
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NEWS AND INFORMATION ABOUT PLANTS AND ANIMALS

MOUSE PORTRAIT

By Carsten Schradin

Male BlackBlackBlack

While looking at the data, three years later, it seems as if I do not know much about the striped mouse male BlackBlackBlack. I don't know his parents, I am not sure how many children he had, and I do not know when he was born nor why he

disappeared. I observed him the last time on the 16th of September 2001. The next day he was again in a trap, but after this I had never seen him again. As he had just changed his territory a couple of weeks ago and become the breeding male of group 6, I am sure he did not disperse and move away. A deadly encounter with a snake or a jackal buzzard is the most likely reasons for his disappearance.

Although it seems I do not know much about him, BlackBlackBlack is

a very special mouse for me, yes my favourite mouse of all the years of field work in Namaqualand. He had a unique personality, always being friendly and kind not only towards his group mates, but also towards me. He was quite an active guy, and traps were his passion. Whenever he heard a trap being set up, he arrived there just like by magic within a few minutes. BlackBlackBlack was really attracted by traps and one must say he had a problem with them, of the kind that some humans have with alcohol. We were so used to each other, that when I found him in a trap I opened it, he walked on my hand, down my arm and jumped on the ground. One minute later he was in the next trap. BlackBlackBlack was really a trapaholic!

The reason why BlackBlackBlack was so special for me is that he was the first striped mouse I really learnt to know. So BlackBlackBlack was for me what the famous chimpanzee Flo was for the even more famous primatologist Jane Goodall. He introduced me into the social life of the striped mice in Goegap. His kind and curious character made it easy for me to follow him in the field and to observe his behaviour.

I met BlackBlackBlack in 2001, during my first field season in Goegap. I came here to study the social system of the striped mice, but did not know what to expect. In captivity I had observed enormous amounts of male parental care in this species, which is why I expected them to live in pairs or groups. However, field studies in the grasslands had indicated that they are solitary. And at the beginning of my field studies I only observed

single mice in Goegap, so did this mean they were solitary here as well? I did not know what I would find, and I did not know if my method of data collection would work, as it was rather unusual for studies on mice. Apart from traditional trapping and marking I wanted to observe their natural behaviour in the field, normally not possible when studying mice. In contrast to most other mouse species, the striped mouse is diurnal and the habitat was very open, but would it be really possible to observe them, or would they hide in shrubs as long as I am around? BlackBlackBlack gave me the answer, and it was "Yes, you can observe us", he allowed me to peek over his shoulder and to observe his private life!

So what was BlackBlackBlack doing all day? Sometimes he was chased away by a bush karoo rat from her nest. These observations lead to a publication on nest site competition between the two species. He was even chased away by female mice from neighbouring groups, but his interactions with the females of his own group were very amicable. Both observations lead to two more publications. Furthermore, BlackBlackBlack was very friendly towards the juveniles of his group, he greeted them enthusiastically by sniffing at them when meeting them at the nest during the afternoon, he groomed them and was sitting in body contact with them. This behaviour of adult males towards juveniles was reported in another publication.

Most importantly, BlackBlackBlack showed me that the striped mice of Goegap were living in social groups,

and that the adult males were important members of these groups. And BlackBlackBlack was simply a very nice guy. This might not sound very scientific, but I did not write a paper about this. However, since I met BlackBlackBlack I am thinking about a possible scientific study on individuality of striped mice. Last but not least: How did BlackBlackBlack get his strange name? Already in the first year I marked mice individually with hair

dye, but not by writing numbers on them. Instead, they got three striped of different colours, blond, red, black or violet. And BlackBlackBlack had three black stripes, he was more or less totally black marked. I wonder if I would remember him as well if his name would have been "Red-Blond-Violet"? With his personality I am sure I would have, but maybe his personality is what made me giving him this catchy name.



BlackBlackBlack was a free living but not a wild mouse. He had a problem with traps that attracted him magically: He was a trapaholic!

Publications that describe observations that were first made with BlackBlackBlack:

Schradin C, 2004. Territorial defense in a group living solitary forager: who, where against whom? *Behav Ecol Sociobiol* 55:439-446.

- Schradin C, 2005. Nest side competition in diurnal rodents from the succulent karoo of South Africa: The striped mouse (*Rhabdomys pumilio*) against the bush karoo rat (*Otomys unisulcatus*). *J Mammal* 86 (August).
- Schradin C, Pillay N, 2003. Paternal care in the social and diurnal striped mouse (*Rhabdomys pumilio*): laboratory and field evidence. *J Comp Psychol* 117:317-324.
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BIRD PORTRAIT: THE JACKAL BUZZARD (*BUTEO RUFOFUSCUS*)

By Carsten Schradin

High above the land of the mice a large raptor is circling. It is a jackal buzzard, the most common bird of prey in Goegap. Their nest is not far away from the field site, on top of a small tree that is growing at the steep slope of a stony hill. When we

are missing a mouse with a radio-collar, this is a good place to search. Over the years we found several radio-collars in the owl pellets of these birds: The jackal buzzard is a mouse-eater! However, our study animals are relatively safe. As most of the time someone is at the field site, the birds prefer to forage somewhere else, as they are afraid of humans. They also prefer preying in the bigger but slower bush karoo and whistling rats.



The jackal buzzard is very common in Goegap. He is a mouse eater and one of the main enemies of the mice. The bird in the picture was taken away from poachers and raised and released in Goegap.

SNAKY SUMMER

It was one weekend in October when I was busy trapping mice at the research station. One group is living directly in front of my office window. They are not part of our study groups, but as the field site is not far away I wanted to mark them, in case some would emigrate to the field site.

We have two nest boxes for the mice at the research station, such that I can videotape their behaviour in the nest. I put several traps in front of the occupied nest box. After I marked the trapped ones, I had a look inside the nest box: 4 very young mice ran out of it as I lifted the lid. They were only 10 days old, too young to run far away. I was sure they would be back soon. Thus, half an hour later I was holding a plastic bag in front of the entrance of the nest box and lifted the lid, to chase the little ones out and into the bag.

As I lifted the lid, I got the shock of my life: A big black cobra was spitting a full load of poison into my face. Seems she found the little ones before me, although later I still trap at least three of them. A spitting cobra can spit her poison for a distance of 2.5 meters, and she always aims at the face of her

opponent. To spit, she applies strong pressure to her venom glands, forcing the poison through her hollow fangs. She doesn't spit because she is evil, but only to protect herself. Instead of biting and being in danger of getting hurt herself, she prefers to spit from a safe distance. Her poison is only dangerous when it gets into the blood stream or into the eyes, but not when it is on the skin. In the eyes, it causes severe pain and can even cause blindness.

Luckily I wear glasses and I was happy that the snake spat instead of biting me. The poison of the cobra is highly venomous, 40mg being enough to kill a human. And with one bite she injects 200-350mg of poison! The poison destroys the tissue and attacks the nervous system.

However, I was not too grateful that she did not bite me. A spitting cobra in front of my door was not what I want. Thus, I got a walking stick and started a fight. I wanted to chase her away from the house. The snake didn't like this and spat like hell, wetting my arms. Although the poison causes no problems on the skin, I nevertheless preferred to wash it away from time to time. Her next shot went directly into my face, so I can tell you that cobra poison tastes really very bitter.



The elegant spitting cobra (here making her hood as a warning sign) can spit its poison from a distance of up to 2.5 meters into the eyes of her enemy.

Finally I manage to chase the cobra several meters away from the house. She was making her hood and looked very angrily at me. Then she comes back into my direction, attacking me with her erected hood. This is not because she really wants to attack me, but because attack is her only defence. A fleeing cobra can be easily killed by her enemy, but a defensive cobra not! She was in fact desperately seeking for shelter. Now she was turning into the direction of a tree next to the house. Still too close for me, so I chased her again. She was getting tired and it seemed she was also running out of ammunition, as she did not spit so much anymore. Finally I managed to push the stick under her. Like a too big earthworm she was hanging from

the stick, and I quickly throw her over the fence. There she was, making her hood and threatening me. But as I made a few steps back she relaxed and quickly disappeared under a shrub.

I hoped she had enough, but two weeks later she came back. I was coming back from a nest observation in the morning, when I saw her next to the house. I got my walking stick and the fight started again, again ending with the cobra flying over the fence. I hope she was now so upset that she won't come back, and that she appreciates that we handled her better than anyone else in Namaqualand would have: People here always kill every snake they see.



The spitting cobra is flying over the fence.

Three weeks later I found a note at my door when I came back from a shopping trip to Springbok: "Danger: Spitting cobra in nest box". One student found her when checking the nest box for young mice. So again it was the cobra, the stick and I. But this time it was another individual, only 1m long. The snake was desperately seeking shelter as I chased her. Finally she found it in a broken mouse trap next to the nest box. It was surprising that such a big snake fitted inside. A student brought me a little plastic tank and carefully I put the trap inside. The next two days the cobra was standing on the veranda in the research station. Then when Brigi was driving to Springbok she got the brave task of taking the snake with her. I asked her to release the snake in the reserve, 5km away from the research station behind a hill.

Neither Brigi nor the cobra was very happy with this idea, and so the snake decided to paint the walls of the tank with her poison, spitting like a little fountain. But finally she was happily released at a new home, under the watchful eye of Brigi and two German tourists that were happy to see this spectacle.

Apart from the spitting cobra, the puff adder is the most dangerous snake in Goegap. One afternoon we found a 1m long individual on our veranda. As the puff adder is moving rather slowly, I quickly got her into a tank with a stick. Two days later she was released away from the research station. While the cobra is a very fast and agile snake, the puff adder seems rather slow. However, she can bite very fast. In fact, no other snake strikes as fast as the puff adder, and her poison is highly venomous. Every year some people

die in South Africa because of a puff adder bite. However, I assure every student that it is much more likely that a car will run you over than that a snake bites them!

A baby puff adder was found a few days later on the veranda and also moved elsewhere. However, apart from poisonous snakes there are other snakes at the research station: We have one brown rubber snake, and putting it into a cupboard or on a bed is a joke several students already had to experience. One morning Carola found that rubber snake in one of the cages of her mice. She keeps some captive mice on the veranda under natural weather conditions. As Carola wanted to start to complain about this bad joke of putting the rubber snake into her cage, the snake started moving: It was alive. During the night, a non-poisonous brown house snake had entered the cage and ate its inhabitant, a male mouse. With the mouse in its belly, it did not fit through the cage bars anymore. So it was easy to remove it from the research station. The same day we found a sand snake basking on the shrub in front of the veranda, only 5m away from Carola's mice. Sand snakes are related to house snakes and not poisonous. Still I caught her and she was removed. We do not want to get the keeping conditions of our mice too natural!

One could get the impression that living in Goegap must be very

dangerous, with all those poisonous snakes but this is not the case. In the last 40 years (and probably much longer), no incident with snake bites ever occurred in Goegap, although thousands of people come here every year and walk through the reserve. Snakes don't bite, if they do not have to. The fast cobras avoid humans and quickly disappear. Adders make a hissing sound when they hear the footsteps of a human, such that one does not step on them. If you wear shoes and long trousers, even a bite would normally not be a problem, as the fangs would only penetrate the trousers. I always tell the students to wear long trousers when in the field, to be aware where they are stepping and not to walk barefooted. And most important: Do not try to catch snakes, so they won't bite you. The only person who obviously does not obey this rule is me. But luckily most students naturally prefer not to catch cobras or other snakes! It is a fact that most humans don't know anything about snakes and so are afraid of them. Many students came here and were afraid of snakes, which they have never seen before in nature. Brigi, my fiancé, was terrified of snakes before she met me. But after encountering cobras and puff adders in the field, some of the most poisonous snakes in the world, the fear changes to respect and admiration for these elegant and beautiful creatures on Namaqualand!

**PLANT PORTRAIT: THE PEE-SHRUB,
*ZYGYPHYLLUM RETROFRACTUM***

By Carsten Schradin

“What is the name of this shrub?” I irritably asked my two South African field assistants. “Pissbosch” was their reply, and piss in Afrikaans means the same as p... in English. So more politely translated, I was looking at a pee-shrub. I do not even want to know where the name comes from, but what a catchy name it is.

The pee-shrub can have a circumference of more than 12 meters and grows up to 1.2 meters high, but normally the circumference is 5 meters and the height only 60cm. It is the dominant plant species at our field site and, although it looks rather boring, quite important for the mice. The pee-shrub offers save nesting sites and food. The branches are very hard and work like thorns. When recovering a transmitter out of such

a shrub one better wears gloves, but still has to expect scratches on your arms and hands. Really a save place to build a nest. In early summer, when the shrub has small fruits of the size of a pinhead, also mice seem to grow in shrubs, as they are busy harvesting. Also the leaves of the pee-shrub are only as large as a pinhead, and they are toxic. This is why goats and sheep cannot feed on this shrub. However, the mice are small enough to choose from the many leaves the ones that have less toxin, at least this is my hypothesis why they can feed on it. During the dry season the leaves of the pee-shrub are a very important food source for the mice, making it possible for them to survive this period of the year. However, the fact that mice can be observed to feed on these leaves year round even when other food sources are available indicates that the pee-shrub does not only serve as an emergency food source. The pee-shrub might look unspectacular for us, but for the mice it is certainly something special.



The pee-shrub offers safe nesting sites and a year round available food source for striped mice.

ZOOLOGIST GOING ASTRAY

By Christina Keller

It was not as if I have had no doubt about choosing a diploma thesis with ecology as focal point. I am a zoologist with heart and soul, and so I was not looking forward to dealing with the complex flora of Namaqualand. On the other hand it was especially this complexity I wanted to investigate. To include as many plant species as possible in my studies, I chose ten very different areas all over the reserve and conducted five vegetation analyses in each of them. Therefore I marked out a square of 2x2m and

determined species and number of every plant occurring in and around the square (Braun-Blanquet-method). Soon I changed my sceptical opinion about botany. I realized that plants have some remarkable advantages in comparison to animals. In contrast to our rodents they do not run away, they do not bite and they do not pee on you. At least this was the first impression I had while I was sitting relaxed in my little square between all the flowers, determining the species' while consulting a book. However, during the next part of my project I soon discovered that there are also some disadvantages. Here I compared the vegetation around

occupied Bush-Karoo-rat-nests with unoccupied ones. I realized that you also have to run after plants, if seeking for a distinctive bush without knowing where it grows, for example a shrub with a nest. When I finally found such a shrub I had to find out if it was occupied. So I searched inside the shrub for fresh droppings, literally digging for "sh...!" Often the thorns of the shrub scratched my arms completely. Better than being bitten by a mouse? Not at all! The statement that plants do not pee on you is fading away, if you walk too close to an *Euphorbia*-shrub, ruining your clothes with the sticky, milky juice. Apparently everything has got two sides.

For a group of tourists my work was at least amusing. I just rode to a

promising rat area by mountain bike and squat in the sand near the tourist route. Suddenly I saw a bus full of seniors. All the elderly people gripped their binoculars and pointed in my direction with lots of "Ooohhhs!" and "Aaahhhs!". Only then did I realize how funny I must have looked. My big cowboy hat on my head, a rope in one hand, a clip board in the other one, on my back a backpack full of books and on my waist the bulky, iron sticks I used for marking the areas. So I pored over a tiny plant. Now I can imagine how an animal in the zoo must feel. At least I was out of their cameras` reach, but perhaps a grandma will tell her grandchild later about the odd creatures creeping around in Goegap Nature Reserve.

VISITORS

By Carsten Schradin

Beginning of November we had our traditional yearly braai at the research station with the workers. We had invited the staff of Goegap to the braai to say thank you for all the help we had received from them during the year. Braai is Afrikaans for BBQ. The difference is that, while at a BBQ one eats the meat when it is

ready, at a braai one first braai's everything, which was three rounds at our occasion (more than 2 hours), and keeps it warm. Only when everything is finished, one starts to eat. While in Germany everything is organized except for a BBQ, in South Africa it is exactly the other way round!



Johan and Koekoes take care of the braai.

Middle of December Mike Scantlebury from the University of Pretoria visited us once more. Mike was quite fascinated from our research on the striped mouse and would like to study this species himself in the future. With him was Mike Fredrik Dalerum from the University of Stockholm,

Sweden visited. Fred worked at the other end of the world, in Alaska, where he studied wolverines. At the moment he is based at the meerkat project of Tim Clutton-Brock in the Kalahari, where he is writing up his PhD thesis on the wolverines.

CONFERENCES, PRESENTATIONS AND PUBLICATIONS

By Carsten Schradin

By the 22nd of December an article of mine about the small mammal fauna of Namaqualand was published in the popular science magazine RODENTIA (in German). In the next three months, two scientific papers on the striped mouse will be

published. Here we already present the abstracts. If you have access to a scientific library, watch out for these papers to appear. Otherwise write an email to info@stripedmouse.com and I will provide you with a copy

Schradin C, Pillay N, 2005. Intraspecific variation in the spatial and social organization of the African striped mouse. *Journal of Mammalogy* 86 (February).

Social flexibility, i.e. the expression of different types of social systems within one species has been reported in several mammal taxa, including rodents. However, sociality in rodents has been studied mostly in captivity and the results are often regarded as laboratory artifacts. We present field data for 2 populations of the striped mouse (*Rhabdomys pumilio*), a diurnal murid rodent from southern Africa. The 2 populations inhabit different environments and demonstrate differences in social organization. *R. pumilio* in the arid Succulent Karoo lives in social groups, comprising multiple adults of both sexes that share one nest and the same territory. Striped mice in the moist grasslands of South Africa are solitary. Females inhabit exclusive territories and male territories overlap those of several females; association between the sexes appears to be restricted to mating. Home ranges of females in the grasslands were 6 times larger and males 10 times larger than their counterparts in the Succulent Karoo. Onset of reproductive activity occurred earlier and at a significantly lighter body weight in grasslands. In the Succulent Karoo, sexually mature offspring remain in their natal group without reproducing. We suggest that group living in the Succulent Karoo is in response to habitat saturation and the benefits of philopatry, whereas living alone in the grasslands may be a response to limiting resources, such as food.

Schradin C, Pillay N, 2005. The influence of the father on offspring development in the striped mouse. *Behavioral Ecology*.

Lay summary:

Males of the same species sometimes show differences in social behavior depending on the habitat in which they live. An ideal model for examining the

relationship between social behavior and habitat type is the striped mouse (*Rhabdomys pumilio*), a small rodent inhabiting many different habitats in southern Africa. In the moist grasslands, this species is solitary, and males visit different females for mating, but do not take care of offspring. In contrast, the striped mouse lives in groups in the succulent karoo, a desert habitat. Here males live permanently with females and their offspring and also participate in infant care. We predicted that differences in night temperatures between these two habitats might be one reason why males show paternal care in the succulent karoo but not in grasslands. Because of the colder nights in the succulent karoo, the presence of the father might be beneficial for huddling young, whereas the father's presence may not be as important in the warmer grasslands. We conducted experiments simultaneously with mice kept in captivity but under natural weather conditions in both habitats and recorded the survival and growth of offspring when the mother raised her offspring alone and when the father was present and participated in raising the offspring. There were no differences in survival of offspring between habitats. As predicted, however, offspring in the succulent karoo grew faster when the father was present, whereas the presence or absence of the father did not influence offspring development in the grasslands. We conclude that one reason males show paternal care in the succulent karoo is to provide warmth for their offspring during cold nights, thereby improving the growth of the offspring; higher night temperatures in the grasslands means that the mother alone is capable of raising her offspring without compromising their growth.

FUNDING OF RESEARCH: CALL FOR DONATIONS

Research costs money and one of the main tasks for a scientist is to obtain funding for his projects. To study the socio-ecology of small mammals in the succulent karoo we have to raise funds. One aim of the FSM-TIMES is to give you the opportunity to support our research via donations. We would like to appeal to all subscribers to donate a small amount of money each year (80 Rand, 10 Euro or 15 dollars). Larger donations are of course welcome and donors of more than 400 Rand (50 Euro, 75 dollars) will be mentioned in the next FSM-TIMES. If you want to donate really large amounts, you can even choose on what the money should be spent by becoming a sponsor (see below). To receive donations we should have a foundation or a society. That would be the ideal solution. However, for a foundation we would need a starting capital of around 50 000 Euro, which we do not have. To establish a society, we would need a board of 7 people that meet at least once a year. Such a meeting would probably cost more than we will receive in donations. As we want to use the donations to support scientific research, we are aiming for a solution that uses as little money for administration as possible. The solution for our problem is an association to the foundation of the University of the Witwatersrand and trust of you into us. The University of

the Witwatersrand has a department that receives and manages donations (see details below). Here you can donate money onto the account "Striped Mice", and the money will become available for projects in Goegap. When depositing money on this account, please state "Striped Mice" as intended purpose. You will then get a letter of appreciation of your donation, and we can use the money to study small mammals.

To deposit money into a South African account is complicated and associated with costs for subscribers from outside South Africa. However, foreigners can still donate into this account. Additionally, we also offer a second option, the option of a trust, that is especially useful for people from Europe. Below we state banking details of two accounts, one in Germany and one in Switzerland. These are private accounts, but if you donate money into them and state "Striped Mice" as purpose, we will use this money for our research. These accounts are especially useful when we have to pay accounts outside overseas, e.g. for radio-tracking equipment from Canada. The FSM-TIMES is for free, but we would welcome and appreciate every donation. We are grateful for each and every contribution and in the last FSM-TIMES of this year we will publish how much on donations we received and how it was spent.

SUBSCRIBERS DONATION

We appeal to all subscribers of the FSM-TIMES to donate 80 Rand (10 Euro, 15 dollars) a year for research on the socio-ecology of small mammals in Goegap. Donations of more than 80 Rand are welcome and donors of 400 Rand (50 Euro, 75 dollars) will be mentioned in the next FSM-TIMES.

Donations will be used for the following purposes:

1. Scientific research on small mammals in Goegap, especially smaller research projects such as Diploma and PhD theses, which have difficulties in raising funds elsewhere.
2. Improving the infrastructure of the research Station.
3. Running costs of the research station.

In the last issue of the FSM-TIMES of every year we will publish how much we received in donations and how the money was used.

Account details for donations

Please state "L.2112" as reference on all deposits and cheques.

South Africa

Standard Bank

Branch: Braamfontein

Account name: Wits University Foundation

Account No.: 002900076

Branch code: 004805

Swift code: SB ZAZ AJJ 00480502

Please state L.2112 as reference.

Germany

Carsten Schradin, KSK Esslingen, BLZ 611 500 20, Konto Nr. 7434686

Switzerland

Carsten Schradin, ZKB, Konto Nr. 117-0028.726.

SPONSORS

Sponsors of large amounts can choose how they money should be spend. There are different options for sponsors:

Research Station Sponsor:

Donations of R1000.00 or more (150 Euro, 200 dollars) can be used to improve the infrastructure of the research station by buying furniture. Especially beds for students, cupboard and shelves are still needed.

Car Sponsor: A very generous donation of R 160 000 (22 000 Euro or 30 000 dollars) could be used to buy a 2x4 vehicle for the research station that would be available for all researchers.

Computer Sponsor: A donation of 5000 Rand (650 Euro, 900 dollars) could be used to purchase a computer or laser printer for the research station.

Solar Panel Sponsor: One big problem at the research station is the shortage of energy. With a donation of 8000 Rand (1000 Euro, 1500 dollars) a new strong solar panel could be bought which would provide the students office with power to use computers.

Thesis Sponsor: A donation of R 8000 (1000 Euro, 1500 dollars) could be used to support a diploma, masters or PhD thesis. Different projects are available. Please send an email when you are interested to support a student to receive more information on possible projects.

If you want to become a sponsor, please write an email to: info@stripedmouse.com

THE MOUSE'S TAIL

BAT IN BATH

In October a large Egyptian slit-faced bat (*Nycteris thebaica*) got lost in our bathroom. This species gets 10cm long and has especially long ears.

Later at a braai (BBQ) we could see bats disappearing under the roof of the bath-room. This might explain why our visitor got lost.

MOUNTAIN ZEBRAS

One afternoon after the nest observations Brigitte was calling Christina and Carola on their way back to the house, but both of them seemed to be very busy getting back and paid no attention. So it was only Annette, Melanie and I who saw what had caught the attention of Brigitte. A herd of 5 mountain zebras had come down from the hills and

was close to the field site. Goegap is the only place outside Namibia where the Hartman's mountain zebras can be seen in nature. There are 3-5 groups in Goegap and we sometimes see them when we drive into the hills, but this was the first time we saw them at the field site, although we had seen their tracks before in the sand.

AUTO-MOUSE

Driving to Springbok one day I suddenly realized I was not alone: On the passenger seat a striped mouse was sitting and its "facial expression" made clear it did not like the rattling car. Quickly I grappled

her, and her ear tags identified her as female 560, a mouse lining next to the research station. Keeping the mouse in my hand I turned around and released her at her home.., I mean our home.

COMING UP IN THE NEXT FSM-TIMES

The title in the next FSM-TIMES is: HOLIDAY AND TRAVEL IN NAMAQUALAND. You will learn all about the highlights in Namaqualand and we will give you many insider tips, only to be shared with friends and FSM-TIMES subscribers.

SGM-SPIEGEL

The FSM-TIMES is also published in German, as the SGM-SPIEGEL. If you want to receive the German version, write an email to: info@stripedmouse.com, please write „SGM-SPIEGEL Abo“ into the subject of your email