



# THE BARKING GECKO

Newsletter of the NamibRand Nature Reserve



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## Winter finery

Greetings from a NamibRand poised in a fine balance between climatic extremes, with the past summer being the driest for at least 30 years throughout Namibia (average rainfall at NRNR around 35 mm), in sharp contrast to 2010-2011 with exceptionally high rainfall for the area (average 340 mm). This winter has been icy, with temperatures as low as  $-8^{\circ}\text{C}$ .

Despite these extremes, numbers of oryx have continued to increase to their present estimate of 10,000, the highest number on record, significantly underlining the importance of the Reserve for the conservation of this iconic species.

Namibia celebrates the inscription of the Namib Sand Sea as the country's second World Heritage Site, a noteworthy achievement that significantly increases the environmental protection of the Namib and its sand sea, stretching endlessly for over three million hectares to the west of NamibRand.

Yet again the debate about the origin of our fairy circles rages, and this time it looks as though the mystery could have been solved—or has it?

Sadly, Mike and my time as wardens at NamibRand has come to an end, although we hope it is not farewell to this wonderful place. We would like to thank one and all for the spirit of co-operation and friendship that has enriched our time here, and wish you all every success in the path ahead.

*Ann Scott*



Photos: Ann Scott

*A tapestry of rich winter hues and textures in the Keerweder area.*

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Photos: Ann Scott

*More images of NamibRand in the clear light and glorious hues of winter.*

## News from the CEO

Our Annual General Meeting (AGM) was held on 31 May 2013. We are happy to report that the Reserve's finances are in a healthy state and that we continue to reach and fulfil our objectives for biodiversity conservation. The AGM was well attended and took place at the Wolwedans Private Camp.

Thank you to NamibRand Safaris for making this a memorable event and for providing scrumptious snacks after the meeting! Our annual game count took place on an icy day, on 1 June 2013. Ten routes throughout the whole of NamibRand were each covered by a team in a vehicle, counting all wildlife seen.

*(Continued on p3)*



Photo: NamibRand Safaris

*The NamibRand "family" at the AGM at the Wolwedans Private Camp on 31 May 2013.*



Photo: Ann Scott

*The game count team for Route 5, counting in the Chateau Plain area.*





*The Namib Sand Sea—recently inscribed as Namibia's second World Heritage Site—stretches endlessly for over three million hectares to the west of NamibRand.*

*(Continued from p2)*

Initial results indicate that, while estimated numbers of springbok remain more or less the same as for last year, those of oryx continue to increase—in fact there are more oryx than ever before on NamibRand! This is interesting in view of the fact that during the past summer season NamibRand received far less precipitation than in the preceding years, and the veld conditions and the available grazing are not as good this year as during the past seven years. The high numbers of oryx could be due to the fact, that although rainfall was low, we still received relatively more rain than some of our neighbours; so it is highly likely that some immigration could have taken place from neighbouring properties. In addition, the absence of competition with livestock and/or the presence of permanent water could be causing their numbers to swell. Detailed analysis of the game count results will shed more light on this. We hope to have the game count report ready for distribution in due course. A big thank you to all for a job well done!

Great things are being achieved by the members of the Greater Sossusvlei-Namib Landscape Association (GSLN). The GSLN has been a key partner in the establishment of the Namib Sand Sea, within the Namib-Naukluft Park, as Namibia's second World Heritage Site. The World Heritage Committee approved the inscription at their world congress in Phnom Penh, Siem Reap (Cambodia) on 21 June 2013 (see <http://whc.unesco.org/en/news/1041>). This status adds significant environmental protection to the Namib. For example, a very positive development from this inscription is that the Ministry of Mines and Energy has agreed to stop all Exclusive Prospecting Licences within the World Heritage Site.

A study of the movement patterns and land uses of oryx, springbok and mountain zebra in and around the Greater Sossusvlei-Namib Landscape (GSLN) is being initiated. One of the initiatives of the GSLN is to open up the Namib through to the escarpment with the objective of creating a "Fence Free Namib". NamibRand and neighbouring land owners have started to dismantle their border fencing on the basis of a Memorandum of Agreement between them. Opening up these

corridors for wildlife will allow animals to start returning to their historic movement patterns and land uses, in response to changing climate and resources.

The objectives of the proposed wildlife tracking study are:

- To document the movement patterns of oryx, springbok and mountain zebra in the central Namib and Naukluft area with a particular focus in and around the GSLN;
- To interpret and understand these movement patterns and the associated land uses by wildlife in response to rainfall and other climatic conditions, veld condition, water availability, other natural resource conditions and issues, and wildlife densities;
- To understand the impacts on movements and land uses by the selected species resulting from fence removal, breaching and the creation of corridors, and to identify remaining barriers and bottle-necks; and
- To develop management guidelines for the three selected species in the GSLN based on an understanding of their movements and land uses, and using wildlife population densities to be derived from camera trap "mark-and-recapture" monitoring and game counts.

With the help of the GSLN a new police station has now also been established in our area. The new police base is located at Sesriem, near the old gate to Sossusvlei. Statistics show that the Sossusvlei area attracts as many guests as the Etosha National Park, if not more. Unfortunately this influx of tourists also brings with it the attention of criminals and other unsavoury elements of society. Some of our tourism partners have suffered break-ins and robberies in the past. The fact that the nearest police station was located at Maltahöhe, some 180k away, often meant that law enforcement and the associated services were inaccessible. The mere presence of a fully staffed police station and the fact that officers will be patrolling the area should hopefully help in dissuading criminals from targeting the area.

We are sad to report that our wardens, Mike and Ann Scott, will be leaving the Reserve to be based more permanently in Swakopmund at the end of July. Under Mike and Ann's leadership the Reserve has flourished. Key institutional

*(Continued on p4)*



*Mike and Ann Scott exploring the wonders of a rain-washed, grassy NamibRand on their arrival in March 2009.*

(Continued from p3)

mechanisms, such as our management plan, environmental impact assessments, wildlife monitoring techniques, administrative procedures, to name but a few, have improved and strengthened. Mike's years of experience as head of natural resource management in nature reserves as well as his calm and efficient manner in getting things done are irreplaceable. Ann's input with regard to visiting researchers, scientific rigor with our research projects and reports as well as her masterful production of the Barking Gecko newsletter will be particularly missed. Quintin and Vanessa Hartung, who will now be taking over the reins, certainly have some BIG shoes to fill!

Fortunately we are not saying goodbye to Mike and Ann completely. We will still maintain a close relationship with the Scotts, who will stay involved with NamibRand to help out with specific tasks and projects. We sincerely thank Mike and Ann for spending the last four and a half years with us and dedicating their time and expertise to NamibRand!

Nils Odendaal



Photo: Boet Matthews

*Congratulations to Quintin Hartung and Vanessa Mouton, NamibRand's new wardens, on their marriage on 4 May 2013.*

## Dark Sky Reserve draws visitors

The International Dark Sky Reserve status of the NamibRand Nature Reserve is beginning to draw visitors. In May 2013, Professor Fred Watson, who is a leading astronomer in Australia, arranged a tour of some 20 astronomy enthusiasts to the Reserve. He and his wife organise tours around the world where each tour has an astronomy theme. This year, they chose to have Namibia and South Africa for their tour area.

They chose Sossusvlei Desert Lodge as a part of their tour specifically because of its location within the Gold Tier International Dark Sky Reserve. After visiting the NamibRand, they went on to visit the Gamma Ray observatory in Gölischau, Namibia and the staff of the proposed Square Kilometer Array



Photo: Pat Hanrahan

*The spectacular eta-Carinae nebula of the southern skies as photographed from Sossusvlei Desert Lodge by Resident Astronomer Pat Hanrahan. This is an area where the Hubble Space Telescope has imaged stars in the act of their formation.*

in South Africa.

Professor Fred Watson is the Astronomer in Charge at Australia's largest observatory in New South Wales. Despite his huge telescope at home, he still was enthusiastic when he had a chance to use the Lodge's 12" telescope. While viewing with Pat Hanrahan (the Lodge's May-June, 2013 Resident Astronomer), he marvelled at the beauty of a number of sky objects such as omega-Centauri and eta-Carinae. These objects are spectacular when viewed from a dark sky location. Eta-Carina has also been a recurrent subject for the Hubble Space Telescope, and a number of newly formed stars have been found within this object.

Dr George Tucker (another Resident Astronomer of the lodge) initiated the planning for the Dark Sky Reserve status and this was achieved in 2012.

Pat Hanrahan

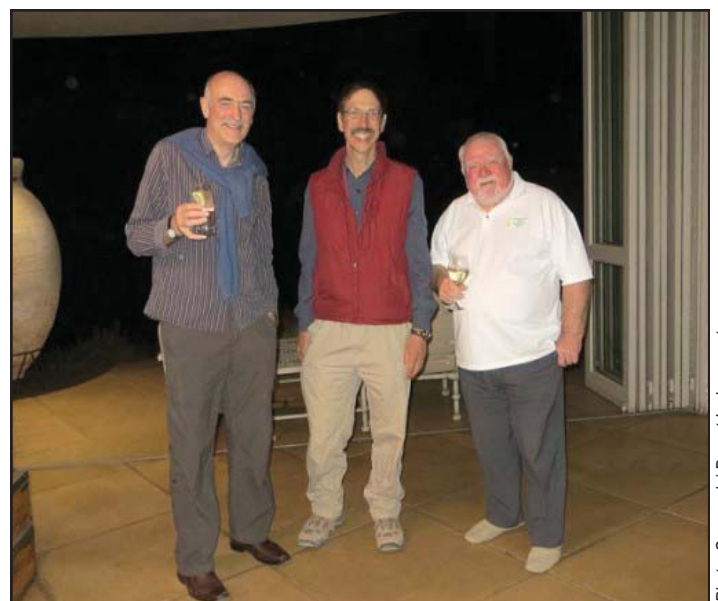


Photo: Sossusvlei Desert Lodge guest

*Fred Watson with Pat Hanrahan, and Ray Johnston at Sossusvlei Desert Lodge. Ray was one of the 20 guests that accompanied Fred Watson on his tour.*



## ***NamibRand's vulture restaurant and hide – a learning experience***

As some of you may recall, a vulture hide was built to service a vulture restaurant on a koppie on Farm Draaihoek. The hide was opened with much fanfare in March 2007. We now say goodbye to the hide, which has been dismantled.

For various reasons the vulture hide never became an attraction and at the end of the day it was not the success that we envisioned. Several NamibRand stakeholders have expressed dissatisfaction with the outcome of the hide and wondered if it had been a waste of time and investment.

The hide was funded by a grant received from the Swedish Local Environment Fund, administered by the Namibia Nature Foundation. No NamibRand funds, other than our logistical support and time, were invested. The funding received was minimal, as the bulk of the manpower for the project was provided through Raleigh International, a volunteer organisation that works on conservation and education projects in Namibia. Several positive contributions to the Reserve were made, other than just the construction of the hide itself.



Photos: Nils Odendaal

*Above: The former vulture hide that was built by Raleigh International volunteers and NamibRand staff.*

*Below: The new picnic facility for Wolwedans guests in the same area.*

The hide was constructed from old telephone poles. These were painstakingly removed from more than 120km of old telephone lines that were taken down across the Reserve, with the help of the Raleigh International volunteers. Every individual pole was dug out by hand and kilometres of copper wire were neatly rolled up. This back-breaking work by NamibRand staff and Raleigh International volunteers took almost a year to complete. The removal of these old, disused poles and wire was in itself was a major improvement to the aesthetics of the Reserve.

Although every effort was made to provide regular food for the vultures at the restaurant, not many vultures took us up on this invitation to dine. This is likely due to a number of reasons, including the lack of permanent water nearby, the fact that the hide was east facing and possibly too close to a main road. In addition to this, it seems that our tourism partners were not keen on using the hide, although their reasons were not shared with us.

The biggest challenge to the success of the hide and restaurant was the lack of regular vulture visits. Soon after the completion of the vulture hide and restaurant, we initiated the cheetah reintroduction project. The pilot group of previously-captive cheetah required regular feeding as they adjusted to life in the wild. Vultures were almost always seen on the carcasses that were left for the cats. Later during the re-introduction programme, when the cheetah started hunting for themselves, researchers who were monitoring the release could always find the cheetah by scouting for vultures descending on their fresh kills. Perhaps the vultures simply preferred to be more involved with the natural food chain. At any rate, the vultures had a regular source of food via the cheetah. Since then there has been a growing number of regular sightings of (wild) cheetah and leopard throughout the Reserve. The confirmed presence of the activity of these predators is an indication that the system is now functioning naturally, with sufficient food for vultures and no further need for supplementary feeding.

Our main motivation with the hide and restaurant was to provide a safe source of food on NamibRand for threatened vultures. Perhaps this aim was actually achieved, not by building the vulture hide and restaurant, but by re-introducing cheetah into the area. Another aim was to educate tourists about these amazing birds that hold such a crucial role in our ecosystems but, due to a lack of interest, this was not achieved. At the end of the day, two main conservation objectives were met in encouraging vultures to stay on NamibRand, namely to provide a safe and reliable source of food and to rehabilitate old and unwanted infrastructure.

On the koppie where our vulture hide once stood, a new structure has been built nearby to serve as a picnic site for visiting guests to Wolwedans. It seems that we had another success with the hide site – we chose a stunning location with a fantastic view!

*Nils Odendaal*

## News from the South

Greetings to all from the South! We hope this issue finds all well.

The building work at Aandstêr has progressed significantly and after another couple of weeks should be complete. The annex at the back has been converted into an *en suite* bedroom and a dining room, with a large veranda for dining outside in summer. Across the lawn, the old hunter's cottage has been revamped and is now two *en suite* bedrooms, with double doors and a veranda opening up to the northern vista. The butchery area next to the shed has been redone, and a veranda added to the back of the shed. A room has been built next to the generator room for ironing and laundry and, last but not least, additional staff quarters have been built. Now the big work starts – cleaning up, establishing new garden areas, removing the rubble and so on.

In April, Nadeet hosted the NEWS weekend, an annual event, and I was asked to do the NRNR presentation and a game drive the following day. Although a relatively small number of people participated compared to previous years, the group dynamics were interesting – mostly mothers and their children. Great to see so many children enjoying the wonders of Nature, and important. But where are all the Dads bringing their children – or was there a golf tournament on that weekend?

Many of you will have heard about the shooting of a collared cheetah on a farm in the area recently. Subsequently it was planned that N/a'an ku sê would attend the next Maltahöhe Farmers' Association meeting in order to open communications between conservationists and farmers. I also attended, in support, and was pleasantly surprised by a largely positive reaction to what Florian Weise had to say. Apart from a couple of exceptions, most were happy for the communication and also mentioned the importance of their grandchildren being able to experience seeing predators in the wild. NamibRand will now join the Farmers' Association and maintain a platform for communication and cooperation. Good news!

We have just completed the construction of a release boma for four giraffes due to be caught on Draaihoek and released on Excelsior/Dina later this month. It is a very exciting project, as they will have access to some 9 km of the Duwisib River complex full of large and ancient camel thorn trees. I am sure they will go forward and multiply there!

Last but not least, we want to congratulate Quintin and Vanessa on their marriage and wish them both all the happiness in the world. Of course Quintin's happiness could be enhanced if he went back to supporting the Stormers after last weekend! Furthermore, congratulations on taking over the Wardenship of the Reserve, I look forward to supporting you in this role in what ever way I can. Well done!

Peter Woolfe



Photos: Peter Woolfe

*Top: The conversions to the annex at the back of the main Aandstêr house have been completed.*

*Centre: Participants in the NEWS NaDEET weekend enjoying a field excursion in the South.*

*Below: The construction of a boma for the release of four giraffes on Excelsior/Dina.*







## News @ NaDEET

Half way through 2013, NaDEET has already hosted more than 17 groups at the Centre. We are again fully booked for the year with school and adult groups. Our three year project funded by the European Union is almost finished and by the end of August we anticipate having hosted all schools in the Hardap Region at least once. This is an achievement that we are very excited about as it coincides with 10 years of NaDEET Centre. Although NaDEET has always been open to all, regardless of income, schools have faced many hurdles in the past years including lack of awareness and of access to transport. The next step will be to ensure that many of the approximately 50 schools in our region continue to come to NaDEET every year.

We have also again hosted several adult members of the local communities, including Maltahöhe, Rietoog and Aranos this year. Through the community programme and an additional educational outreach in Rehoboth in April, NaDEET has disbursed over 250 solar cookers to local households since 2010. We hope to increase this in the coming years.

Together with selected staff from almost all other NamibRand concessionaries, NaDEET staff refreshed their first aid skills during a two day course at the Centre (see article on p8).

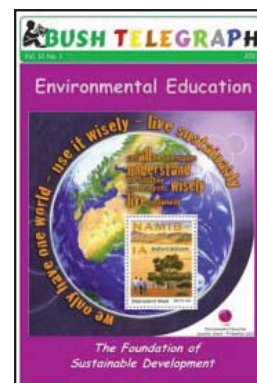
The most recent issue of the Bush Telegraph magazine explores the topic of environmental education and thereby celebrates 10 years of NaDEET Centre. We are honoured that NamPost joined us by issuing an environmental education souvenir stamp that also recognises this achievement. Bush Telegraph continues to have a print run of 18,000 and a direct distribution of slightly more than 16,000 through Namibia. We estimate that every issue is read by at least two people, thereby doubling the actual readership and outreach impact.

We are celebrating NaDEET Centre's 10 year anniversary throughout 2013 with publications and events that are posted on-line. We invite you to visit our Facebook and website for on-going updates and news of exciting activities.

*Viktoria Keding*



*Elizabeth Lemmert testing a participant on how to use a solar cooker - one of the practical tests to earn a voucher towards ownership of a cooker.*



*"A blast from the past": Viktoria Keding with Margrietha (one of the first employees of Tok Tokkie Trails on NamibRand about 15 years ago) - now returned on a NaDEET course.*



*Members of the Maltahöhe community returning home with solar cookers and self-made fuel-efficient stoves - now equipped to live more sustainably.*

## First Aid course at NaDEET



Photo: NaDEET photo library



Photo: Vanessa Hartung



Photo: Absalom Vilho

Top: Successful participants in the Johanniter Hilfswerk First Aid course at NaDEET proudly display their certificates.

Centre: Practical first aid training session.

Below: Training included the treatment of realistic "wounds" that were painted onto the "casualties".

On 15 May 2013 the Johanniter Hilfswerk First Aid assistance visited the Reserve to provide first aid training to a few people. This course took place at the NaDEET training centre.

During this training, which took place over two days, we learned all the basics of first aid, i.e. what is first aid, what to do in an emergency situation, what should be done by a first aider, how to perform CPR (cardio pulmonary resuscitation), how to treat a snake bite and much more.

First Aid is to learn how to respond first in an accident. The aim of the first aider is to save a life or to help someone to recover.

There will be situations where one would need to act immediately before making an emergency call and this is why it is necessary to be able to identify the urgency of medical assistance or any first aid assistance.

An emergency is identified when a person is unconscious and does not react.

There are three vital signs to check:

- Breathing
- Heavy bleeding
- Unconsciousness

And three vital organs that should work at all times:

- Brain
- Heart
- Lungs

### Guidelines on how to treat a snake bite

- Always make sure that you stay calm, and also calm down the casualty.
- Try to identify the snake because different snakes can have different effects in different places in the body.
- The different types of dangerous snakes can include: mambas, cobra, zebra snake, adders, and twig snake. The bite can affect the nerves (mambas, cobra, zebra snake); tissue (cells) (adders, zebra snake); and the blood (twig snake; mambas).
- Keep the casualty as stationary as possible.
- Try to suck out as much of the poison as possible. The poison can be sucked with a suction device or one can even suck the poison with one's mouth, just make sure the mouth is protected (e.g. with a plastic bag), especially if there are open cuts or sores in the mouth.
- Get medical attention as soon as possible.

Vanessa Hartung



# The biological underpinnings of Namib Desert fairy circles

## Has the puzzle about the origin of fairy circles been solved?

On 29 March 2013 a story made front-page news on the New York Times and ricocheted around fairy circle scientists and other fans of these mysterious phenomena. Has the answer to the much-debated mystery of their origin finally been found – are fairy circles in fact caused by the sand termite *Psammotermes allocerus*?

The findings of researcher Norbert Jürgens (Juergens) are described below, based on his recent paper published in the prestigious *Science* journal\*. We also asked several fairy circle researchers associated with NamibRand for their comments, and leave the reader to decide.

**\*Full citation:** Norbert Juergens. *The Biological Underpinnings of Namib Desert Fairy Circles*. *Science* 29 March 2013: Vol. 339 no. 6127 pp. 1618-1621 DOI:10.1126/science. 222999

The sand termite *Psammotermes allocerus* generates local ecosystems, so-called fairy circles, through removal of short-lived vegetation that appears after rain, leaving circular barren patches. Because of rapid percolation and lack of evapotranspiration, water is retained within the circles. This process results in the formation of rings of perennial vegetation that facilitate termite survival and locally increase biodiversity. This termite-generated ecosystem persists through prolonged droughts lasting many decades.

Fairy circles (FCs) are large, conspicuous, circular patches devoid of vegetation in the centre but with perennial grasses at the margin. These patches occur in large numbers in the desert margin grasslands of southern Africa. The cause of these circles has been attributed variously to plants, ants, or termites; however, most of these early hypotheses have been systematically tested and rejected. Further hypothesised causes include an unknown semivolatile substance in the soil, a geochemical origin, carnivorous ants and "selforganising vegetation dynamics". Despite the many hypotheses, both the origin and the ecosystem function of FCs are still a much-debated mystery.

Jürgens used a long-term data set describing the environmental and biogeographical characteristics and dynamics of FCs to identify the most likely cause of these unique formations. He also analysed the function of FCs in terms of water management, biodiversity, and adaptation to arid conditions.

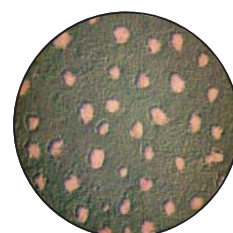
He hypothesises that the FC, while not losing water by transpiration because of the absence of plants in its centre, accumulates rain water as a result of the rapidly draining large pore size of sand. The rapid percolation to a deeper soil layer reduces evaporation loss.

(Continued on p10)



Photos: Ann Scott

Fairy circle images photographed from a hot air balloon in the northern parts of NamibRand in April 2011.







What causes the even spacing among fairy circles?

(Continued from p9)

The amount and the longevity of the water body underneath the FC allow the formation of a belt of perennial grasses at its margin.

The majority of FCs possess such a perennial belt (PB), and they are essential for the ecosystem functioning of the FCs. He tested the hypothesis of a biogenic origin by interpreting the area of distribution of FCs as a clearly defined "environmental envelope" (occurring in an area with 80-120 mm mean annual precipitation, and in deep sandy soils) of an organismic taxon causing intraspecific competition for space.

Data collected over 40 field trips were used to assess systematically which organisms are associated with FCs. Species' distribution maps show that only a few organisms are associated with FC "hotspots" across their entire distribution. Among termites, only the sand termite (*Psammotermes allocerus*) was found at all FC hotspots. Whereas the Namib desert termite (*Baicaliotes hainsii*) occurs only south of the southern Central Namib, *P. allocerus* is widely distributed over southern Africa and thus exceeds the FC distribution. Three ant species (*Messor denticornis*, *Anoplolepis steingroeveri*, and *Tetramorium* sp.) were found in several FC hotspots, but none of them in all.

Only *P. allocerus* was found in high frequencies (80% to 100%) in or next to all single FCs. The characteristic "sheetings" (thin layers of cemented sand built over the foraged plant material) of *P. allocerus* were found at 80% to 100% of the FCs and throughout all life stages of the FCs. In addition, in 80% to 100% of FCs, *P. allocerus* nests and underground tunnel-like galleries were found a few centimeters to decimeters underneath the bare patch, the PB, and the matrix area.

Although these associations suggest a causal role for *P. allocerus*, it is possible that they may instead merely reflect the colonisation of FCs by the termites. However, these termites were found even in the initial state of new FCs, that is, before the water accumulation has begun and the perennial grass belt has developed. During the further life history of FCs, *P. allocerus* is directly involved in keeping the bare patch of



Fairy circles enhance biodiversity by attracting many organisms, from tiny insects to oryx and plains zebra.

FCs free of grass. These correlations suggest that the burrowing activities of *P. allocerus* within the bare patch do not only serve in taking up water; their foraging on the roots of freshly germinated grasses kills them and keeps the bare patch free of vegetation. Furthermore, *P. allocerus* is involved in widening the diameter of the circle.

The main ecosystem function of FCs is related to securing two important perennial longterm resources. First, the removal of all water-transpiring plants allows the accumulation of water underneath the FC after rain events (water trap). Jürgens hypothesises that the generation of a perennial water supply facilitates the survival of termites in a hostile desert. Whereas the annual rainfall evenly distributed in space allows ephemeral or annual plant growth, the removal of plants allows perennial growth of plants in the perennial belt (PB). He argues that this generation of perennial plant biomass is the second facilitator of survival of termites, even in extreme drought years. The manner in which the termites create and manage the perennial grass population within an otherwise ephemeral desert environment supports the hypothesis of active ecosystem "engineering". The formation of the PB is a consequence of the water accumulation and the unidirectional suppression of competition, both caused by the termites.

FCs strongly enhance biodiversity by attracting many organisms. A number of ants, bees, wasps, small mammals, and plants are found more often in and near FCs. Plant species, for example, the Cucurbitaceae *Citrullus lanatus* with its large water-storing fruits (and even *Acacia erioloba* trees), establish themselves within or next to FCs in the reticulate dunes at the eastern margin of the Namib dune field. Furthermore, the population of *P. allocerus* termites itself forms an attractive resource, which is used by geckos, aardvarks, bat-eared foxes, blackbacked jackals, golden moles, and spiders as well as by omnivorous ants. In summary, FCs, like oases in the desert, increase biodiversity (quantified as the number of species) by one to two orders of magnitude.

(Continued on p11)



(Continued from p10)

FCs can be regarded as an outstanding example of allogenic ecosystem engineering resulting in unique landscapes with increased biodiversity, driven by key resources such as permanently available water, perennial plant biomass, and perennial termite biomass. *P. allocerus* turns wide desert regions of predominantly ephemeral life into landscapes dominated by species-rich perennial grassland, supporting uninterrupted perennial life even during dry seasons and drought years.

Adapted from a report by  
Norbert Jürgens



Photo: Ann Scott

What causes fairy circles to be round? Note the "perennial belt" of taller grasses around the edge.

## COMMENTS BY OTHER FAIRY CIRCLE RESEARCHERS

**Dr Mike Picker, Kelly Vlieghe and Vere Ross-Gillespie  
(University of Cape Town, South Africa)**

We find the Juergen's hypothesis and data very convincing, especially since social insects have transformed landscapes in comparable ways in many other arid and semi-arid regions of the world.

**Dr Walter Tschinkel (Florida State University, United States)**

The strong correlation between *Psammotermes allocerus* and fairy circles is not evidence that the termites cause the circles. Such evidence would have to be derived from experiments in which the termite populations were manipulated and the response measured in terms of fairy circle formation or disappearance. If this termite is indeed the cause of fairy circles, then it would have to be able to account for all the important properties of fairy circles - their circularity, their overdispersion, the proportion of bare surface, their changing diameter in different soils and latitudes. Unfortunately, no mechanism to account for any of

these has been proposed.

Tschinkel adds, "*P. allocerus* is common at NRNR and I collected it many times in 2007. I am attaching the ID sheet from Vivienne Uys. I often found it in galleries surrounding dead grass".

**Dr Michael Cramer (University of Cape Town) and Nichole Barger (University of Colorado at Boulder, United States)**

We think Norbert Juergens's paper has taken us incrementally forward. We were puzzled by the insect damage to plants within the circles, which looked like termite damage, but that Mike Picker had ascribed to ants. Based on the evidence from our research on fairy circles, we accept that the termites do play some role in the maintenance of fairy circles. However, as pointed out by Walter Tschinkel elsewhere, correlation between the presence of termites and the occurrence of fairy circles does not equal causation. As for ants, it is likely that termites occur at higher density on fairy circles than off, due to the higher water content of the circles. There are, however, several questions that still need to be addressed regarding the termite hypothesis:

- 1) Are termites so dependent on the higher water content that they engineer these vast barren circles with their food resources chiefly only on the periphery where, in fact, soil water is lowest (same as in the matrix)?
  - 2) Is the biomass of *P. allocerus* sufficient to account for the removal of something like 20% of the grass?
  - 3) Why are the large fairy circles so uniformly spaced if the termites construct rather tiny "spoil dumps"?
- Our opinion is, however, that further discussion of the potential role of termites or other mechanisms is rather futile without additional data!

**Dr Carl Albrecht (University of Stellenbosch, South Africa)**

Some questions:

How does a termite eat a healthy grass root covered "wall to wall" with Namib sand? The sand particles are firmly attached to the root. This is a fact anyone can investigate. You can wash the root in water and the sand will remain stuck!

I believe the sand particles are stuck to the root hairs with a "bio-glue" secreted by healthy root hairs.

Un-healthy, weakened, affected, poisoned (whatever) roots secrete much less root hair "bio-glue" and bind less sand particles. This I believe is one of the deepest secrets of the Fairy Circle mystery. I think this would be like eating a mielie through a tennis racket!

I think something else is weakening the grass roots FIRST, which shed the sand particle coat and then the root becomes edible for the sand termites.

I have some SEM (scanning electron microscope) pictures of healthy grass roots covered with sand particles attached to root hairs, and weakened roots with far less sand attached.

(Continued on p12)

**Dr Yvette Naudé, Dr Gretel van Rooyen and Dr Egmont Rohwer (University of Pretoria, South Africa)**

*\*Note that the numbers in square brackets refer to the references quoted on p13*

The article by Juergens (2013) [1] provides a valuable account of his detailed observations on the biodiversity and water relations of fairy circles. Although evidence of a correlation between termites and fairy circles was presented by Juergens a few unanswered questions on the causal relationship still remain. Some of these questions are outlined below.

For decades many researchers have investigated insect foraging, in particular termite foraging, as causal agent of fairy circles. Surely the mystery would have been solved ages ago if it were merely a matter of live plants or roots being eaten or disturbed by insects to engineer fairy circles. Considering that each of the millions of circles represents termite activity or a colony, it is rather curious how insect feeding, on such a dense scale, can take place so furtively. Even more perplexing is that this stealthy behaviour was quite readily detected by a single observer [1], but not by others [2,3,4]. The evidence provided by Juergens that termites are engineering the circles is circumstantial and insects have yet to be caught in the act of making these circles.

It is not disputed that life, be it mammals, insects or microorganisms, is attracted to the circles since the circles and surrounding edge supply food and moisture. It remains unclear how insects are able to launch such a surreptitious and synchronised snack attack to construct a circle with desiccated, dead vegetation. A striking example of synchronised die off of *all* the vegetation within a patch can be seen in Tschinkel's (2012) paper: Fig. 11A [2]; reproduced below:



Juergen's hypothesis, that fairy circles are rain water traps, is not new [1]. Albrecht *et al.* (2001) first proposed that fairy circles are rain water traps created by termites [5]. However, the authors could not reconcile their bioassay results with insect foraging as a causal agent. Albrecht *et al.* subsequently proposed that a semi-volatile chemical associated with termites was killing the plants in order to generate circular rain water traps. Our own observations have however shown that

vegetation was already visibly moist even *before* plants die off and the development of a patch of barren soil. It is possible that patches of increased soil moisture during a dry season, and long after scant rain, are due to a source other than rain [6].

Results of *in situ* and *ex situ* experiments are not easily explained by the proposed termite hypothesis. An *in situ* study by Jankowitz *et al.* (2008) pointed to the presence of a subsurface seep factor in the circles which causes plants to die off [7]. Unfavourable soil alteration in fairy circle soil was confirmed by Van Rooyen *et al.* (2004) and Albrecht *et al.* (2001) when plants did not survive when grown in soil collected from within fairy circles in laboratory trials in the absence of termites [3, 5]. Neither can the termite hypothesis shed light on the anaerobic conditions in the circles which are implied by the general absence of aerobic organisms (vesicular-arbuscular mycorrhizae (VAM)) in the roots of plants within circles [8], and by a microbiological study showing a significant higher density of anaerobic bacteria within circle soil [9]. Furthermore, soils contain a glut of complex hydrocarbon mixtures, totally unrelated to that of insects but typical of petroleum systems [10,11], confirming that intermittent degassing from circles is geological and not biological [10]. Patches of dead/desiccated vegetation appear suddenly during or after rain and flooding. None of these vital clues support insect foraging as a causal agent. Besides, fairy circles can be seen in the absence of a so-called perennial belt of luxuriantly growing grasses, which Juergens contends is essential for the ecosystem functioning of fairy circles.

A preoccupation with a biological origin of the fairy circles seems to be based solely on the spatial pattern of the circles – assumed to be a consequence of inter-colonial aggression. However, apparent organised phenomena are not exclusive to biological systems. The space filling nature of fairy circles is characterised not only by evenly spaced arrangements, but also by random displays and a prevalence of bound circles.

The overlapping of circles; the rapid appearance of patches with stressed/dead/desiccated vegetation during or after rain and flooding; patches of plants dying all at once; possible anaerobic conditions within circles; complex petroleum hydrocarbon mixtures; bioassays demonstrating that plants experience stunted growth even in the laboratory when grown in fairy circle soil; subsurface seepage causing a marked difference in growth of plants in containers with and without intact bottoms (within circles); and circles appearing in the absence of a perennial belt all preclude insect foraging as the maker of fairy circles.

Ultimately, the answer will most certainly lie in the simplest, least convoluted mechanism. Our hypothesis of subsurface natural gas releases as primary causal agent for the circles [10] still begs to be challenged.

(Continued on p13)



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## Website links

- <http://www.nytimes.com/2013/03/29/science/fairy-circles-in-africa-may-be-work-of-termites.html?hp>
- <http://www.businessinsider.com/mystery-of-fairy-circles-solved-2013-3?op=1#ixzz2PO2Cmtbh>
- <http://news.sciencemag.org/sciencenow/2013/03/fairy-circle-mystery-solved.html>

## Wild idea changing the view of observer



Photos: Lucas Mbangi

*The huge Namaqua chameleon photographed in dune habitat.*

It was on a walking safari in the morning of 10 May 2013, that I spotted one of the desert masters. Living in such an inhospitable environment, the Namaqua chameleon's body and behaviour evolved to keep it from overheating. It digs holes in the sand to reach the cooler sand beneath, or may hide in burrows built by other animals.

All chameleon species are capable of colour change, which is not only for camouflage as generally assumed. The chameleon may also change colour in response to other chameleons, when fighting or mating, or to temperature and its surroundings. Mating can take place up to three times a year, producing 6-20 eggs in each clutch. The eggs incubate for 3-4 months in the sand. They became reproductively active between five and seven months old. The nasal glands are adapted to excrete salt, allowing the Namaqua chameleon to reabsorb water as much as possible.

The chameleon's lifespan is relatively short, with that of a female shorter than a male. A female chameleon lives for 3-5 years, while a male lives for 5-8 years.

*Lucas Mbangi (Wolwedans Field Guide)*



Photo: Ann Scott

*A cold winter's day with low cloud in the dunes near Erioloba Forest.*



## Top sales of fairy circles in 2012



Photo: NamibRand Safaris

*Congratulations and well done to Wolwedans guide Theodore (Quinton) Beukes, who sold 56 fairy circles in 2012 - a Reserve record. The fairy circles are "adopted" by guests as part of the fund-raising initiatives of the NamibRand Conservation Foundation. More on this story in the next issue of this newsletter!*

Gerald Dobson

## Spotty patterns

We have been comparing some photographs of recent cheetah sightings in the northern part of the Reserve (see photographs below). Flo Weise and Stu Munro of N/a'an ku sê have kindly assisted us in confirming that the two right-side images on the bottom left (A and C) are of the same individual, photographed first by NamibRand field ranger Elton Vries at Kwessiegat on 30 May 2013 (C), and then near the Verweg gate on 3 June 2013 (A). They have pointed out distinct triangular and ring patterns on the tail (ringed in yellow), and also on the right foreleg, that are consistent across the images; in addition, there is a strong (and unusual) "tear" mark on the face.

We were fortunate to obtain a left-side image of the same animal (B) at Verweg on 3 June, and can confirm that it corresponds with a similar photograph taken in the same area on 21 July 2013 (D). This is one of a pair that seem to have taken up residence within the road corridor, possibly because of the ease of capturing prey trapped inside the fences. As these barriers are in the process of being removed, it will be interesting to see whether these cheetah remain in the area or move on to more productive sites. We are also investigating whether this pair could be the juveniles that were released at Aandstêr last year—so watch this space!

Ann & Mike Scott, Quintin & Vanessa Hartung

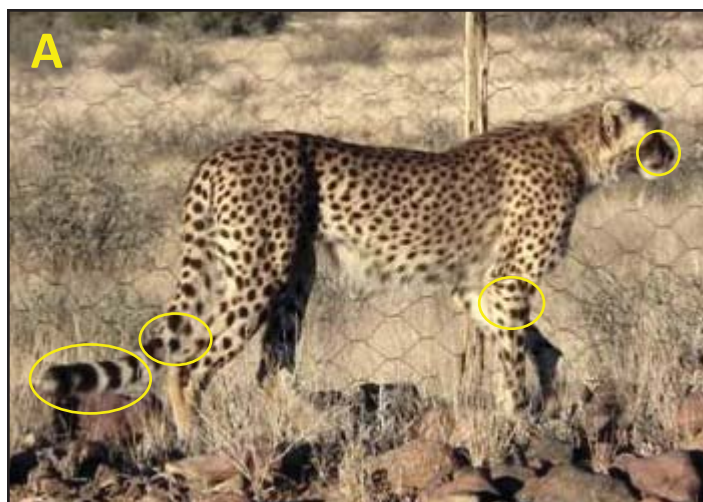


Photo: Ann Scott

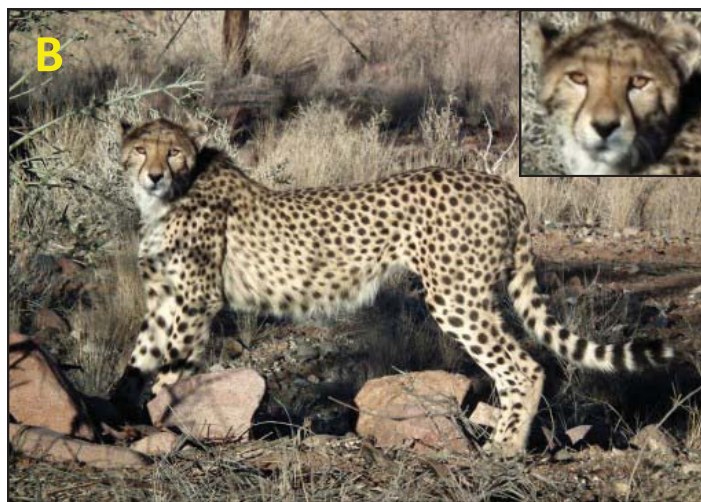


Photo: Ann Scott

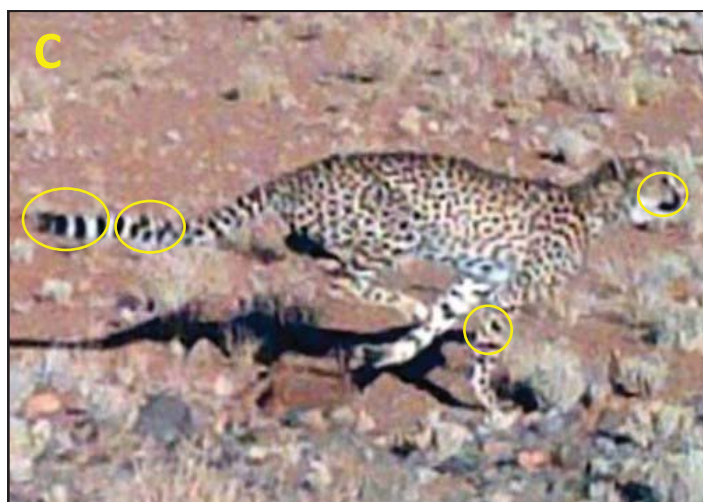


Photo: Elton Vries

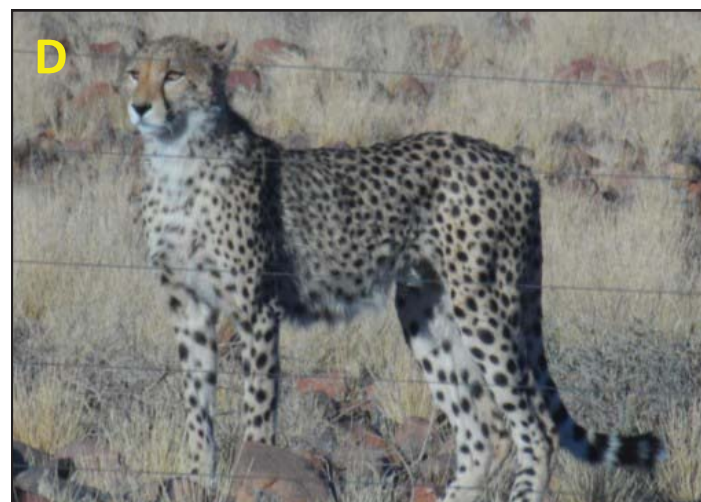


Photo: Quintin Hartung

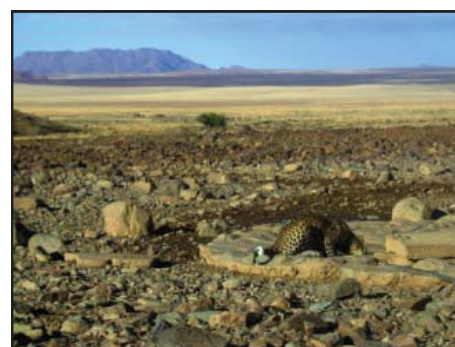
*A, B C and D: the same individual, photographed at Kwessiegat on 20 May 2013 ( C ), Verweg gate on 3 June 2013 ( A & B ) and in the Verweg area on 21 July 2013.*



## Camera trap photo gallery



Left: Unusual record of three klipspringers at Moringa.  
Centre: Mountain zebras often drink at night; Moringa is of particular importance for these zebras.  
Right: Large kudu bull at Draaihoek.



Left: Spotted Hyaena at Geluk.  
Centre: Leopard at Moringa on 14 March 2013.  
Right: Two aardwolf at Geluk.



Left: Black-backed Jackal at Geluk.  
Centre: A young baboon hitches a ride on a handy back at Draaihoek.  
Right: Cape fox are seldom seen during the day, but appear regularly at night on the camera traps; this one is at Geluk.



Left: Mystery raptor at Moringa—is this a buzzard?  
Centre: A glossy Cape (Black) Crow at Geluk.  
Right: Two Spotted Eagle-Owls come for a drink at Geluk.

Contributed by Quintin & Vanessa Hartung



## Interesting sightings and photo gallery



Left & centre: Temperatures below freezing produced some unusual ice artwork at Verweg one winter's morning (Quintin & Vanessa Hartung).  
Right: A baboon in blissful contemplation, photographed at the Gorrasis Fig Tree picnic site (Quintin Hartung).



Left: Flocks of Namaqua Sandgrouse frequent the waterholes under these dry conditions, sometimes having to dodge Lanner Falcons (Ann Scott).

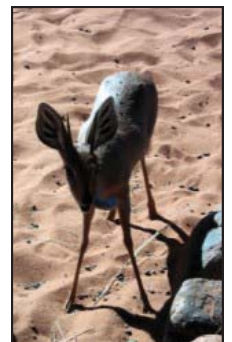
Centre: The Pygmy Falcon (male, with a grey back) is often associated with Sociable Weaver nests (Ann Scott).



Left: A Spotted Eagle-Owl (western form: rufous brown with orangish eyes—but note the fine barring on the chest) stares at a juvenile Pale Chanting Goshawk (Felix Vallat & Barbara Wayrauch).

Centre: A male Ludwig's Bustard (now Globally Threatened) feeding around the Keerweder waterhole (Ann Scott).

Right: This huge Cape cobra was being watched with interest by an adult Pale Chanting Goshawk (Ann Scott).



Left: Springbok seen at Boscia in what turned out to be the start of a nomadic group movement to the west, on 3 May 2013 (Ann Scott).

Centre & right: This male steenbok made itself at home at the Wolwedans Dune Camp on 31 May 2013, intent on feeding on camel thorn pods and seemingly indifferent to the delighted observers a few metres away (Ann Scott).



## Winter cap on the Losberg



Photo: Peter Koep



Photo: Ann Scott

*The summit of the Losberg is enveloped in thick cloud on the icy morning of the NamibRand annual game count, on 1 June 2013.*

### Thank you

Many thanks to those of you who have contributed to this issue of The Barking Gecko by providing articles/information: Gerald Dobson, Pat Hanrahan, Quintin Hartung, Vanessa Hartung, Viktoria Keding, Lucas Mbangu, Nils Odendaal and Peter Woolfe; and fairy circle experts Dr Carl Albrecht, Dr Yvette Naudé, Dr Mike Picker, Dr Egmont Rohwer, Vere Ross-Gillespie, Dr Walter Tschinkel, Dr Gretel van Rooyen and Kelly Vlieghe. We would also like to thank all those who so generously share their photographs and interesting sightings! Thank you to Mike Scott for editorial inputs.

The Barking Gecko is your newsletter and, as always, we hope you will continue to submit your contributions of news and views, short reports, sightings, artwork and photographs.

**KINDLY NOTE:** Photographs are copyright and may not be re-used without the permission of the photographer.

### ERRATUM

*The previous issue of this newsletter (Vol. 14 No. 1, March 2013) included a fascinating tailpiece entitled, "Introducing Hotspur" (see photograph above). The name of the author was unfortunately omitted during the conversion of the file to pdf format, and we extend our sincere apologies to Dr Morris Gosling for this error.*

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