

Gobabeb Times

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"Oasis of Learning"

From the Editor's Desk: Year of the !Nara

Emily Mutota, Editor

Another new year begins: a year of new resolutions, a year of changes. For Gobabeb, 2009 is devoted to celebrating and honouring the !nara plant—the plant close to our heart and the hearts of those close to us (the Topnaar people). The !nara, a keystone species, offers various opportunities in relation to our Centre's objectives, in training, research as well as community development. Articles presented in this issue demonstrate how Gobabeb continues to promote sustainable lifestyles and conservation practices, in particular those related to the !nara. The articles outline valuable lessons from past and present projects. They also offer fresh inspiration for initiatives projects in future.

Finally, we would like to thank our friends and donors who have supported and contributed to the development of Gobabeb past and present. We look forward to your continual support. Best wishes for 2009 and we hope you enjoy this issue.

Emily

From The ED's Desk-2009 looking forward!

Joh Henschel, Gobabeb Executive Director

For the natural sciences, years ending with a '9' seems to have a special significance, and the years '09 and '59 are particularly special. So then, what about this '09 and Gobabeb?

Two-hundred years ago, in 1809, Charles Darwin was born. The significance of this became apparent 50 years later, when in 1859 he published the book "On the Origin of Species", which marks the origin of a new way of thinking about life. The same year, 1859, was when Alexander von Humboldt died (he was born in a '9' year, 1769). Without Humboldt, there would have been no Darwin, one could say, as Humboldt, the father of physical geography, was a grand naturalist and inspired many following generations with his broad-encompassing publication series "Cosmos". Gobabeb's research history and way forward are inspired by these great scientists and we have just cause to join the world in celebrations.

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Dr. Seely (right) & Co-author John Pallett with Minister Netumbo Nditwah (centre), at the launch of their Namib book at Gobabeb, 2008

Seventy years ago, in 1939, Mary Seely was born. The significance of this event became apparent when in 1969 (40 ya) she became deputy director of Gobabeb, and a year later director, a position she held until 1998. Desert research world-wide has never been the same since Mary was instrumental in bringing it to its first full flourish. She still chauffeured the 1999 kick-off of the German-funded SADC programme concerning the further development of Gobabeb, and look at what great things have become of Gobabeb through that! Mary inspired at least three generations of researchers, and this continues, as young professionals scoop from her vast toolkit of wisdom in meeting the new challenges of 2009 and beyond.

Fifty years ago, we must not forget, is when Gobabeb itself first came to feature prominently. In 1959, Charles Koch and a team of other scientists under the auspices of the Transvaal Museum from South Africa visited Gobabeb and initiated research that soon after appeared in a series of publications.

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Photos: Gobabeb

This laid the foundation for the establishment of the Gobabeb Centre in 1962. And the rest, as they say, is history. Gobabeb now has a treasure-house of 50 years data and a bank of knowledge about the oldest desert of the world, and its surroundings.

Ten years ago, the Joint Venture Agreement between the Ministry of Environment and Tourism and the Desert Research Foundation of Namibia was translated into action, giving Gobabeb its new face. One year ago, the Namib-Naukluft Park celebrated its centenary at Gobabeb and took a page or two of valuable lessons from what this park was, is and can be.



Audience at the Namib-Naukluft Park centenary celebration, in October 2008 at Gobabeb.

So what about 0 years ago, 2009? Standing on the shoulders of giants one can look far! And what do we see? I see a changing world in need of knowledge and know-how on how to adapt, mitigate, or restore. The big questions appear small: "What changes are critical, at what scale?", "How to predict, intervene and engineer changes of living systems?" This will require us to sharpen the tools that have been developed for half a century at Gobabeb and tap into long-term datasets and established knowledge as well as creating new assemblies. The biggest current challenge for Gobabeb is epitomised in Restoration Ecology, two inseparable words. We who are steeped in ecology realise that we still have a great deal to learn when it comes to the question of restoring living systems. The world around us, not only the immediate neighbourhood, but also Namibia, Africa, and the entire Earth, is facing the real need of fixing environments that have broken as we saw off the branch we are sitting on. If Gobabeb meets this challenge, new levels of critical knowledge and practical capabilities will result and contribute towards saving the world drowning in economic-driven progress. Of course, meeting this challenge will by no means be achieved alone, but Gobabeb is in a key position institutionally and geographically. 2009 is the tipping point in time.

So why "Year of the !Nara"? It is a fitting symbol of life in the desert and the various challenges and opportunities it faces, as well as our ability to harness its characteristics in order to manage the environment. Let 2009 be a year to be remembered!

!Nara –a keystone species in the desert environment

Michael Matengu, Research technician assistant

What could possibly be so special about the so called !nara plant? Could it be its adaptability to the Namib? Or the ecological role it plays as a habitat for different species? Or maybe the important role it plays for the Topnaar community?

Every year hundreds if not thousands of people ponder and wonder about this plant, and its importance? What role does it play in the desert ecosystem? !Nara, a perennial dioecious, cucurbitaceous and endemic plant of the Namib Desert is a thorny leafless melon-bearing plant with grooved longitudinal stems on which the stomata are situated. Its stems and thorns take over the function of photosynthesis.

The plant has a long tap root system that stretches about 40-60 meters deep in search of ground water and nutrients. All this enables the !nara to grow under harsh desert conditions. During its growth, wind blown sand piles up around the branches forming large hummocks (sand islands) around the plant. Male plants flower throughout the year, and female plants flower and produce melons in summer. Plant pollination is done by insects, mostly the *Meloidae Mylabris zigzaga*.

The plant is an important component of the dune ecosystem, providing shelter and food to many different animals, and bringing moisture via its deep roots to the surface. The fruit, seeds, growing tips and flowers are highly nutritious, while the ragged canopies of both sexes provide shelter to dune animals. The !nara is regarded a key stone species as it acts as a direct protein, fatty acids and water source for insects, reptiles, mammals, and birds, an indirect food source as it collects detritus that is fed on by many beetles, and a stabilizing influence in the dunes. The !nara nurtures about 80 small organism species, 26 vertebrate species known to use the plant. Jackals were found to be the main dispersers of the !nara seed.

The !nara is not only valuable to other plant and animal species but also for the rural Topnaar community residing along the lower Kuiseb River. The Topnaars harvest and use the !nara melons as a major nutritional source, and to a small extent as a source of capital. The roots are used for medical purposes such as stomach pains, nausea, gonorrhoea, kidney problems, internal diseases, and arteriosclerosis and chest pains. The plant also has some economic value, depending on the quality of the harvest. According to a study conducted in 2007, seeds earn about N\$6.50 per kg. Roasted seeds with salt and spices are sold to tourists and local people for N\$5.00-N\$10.00 per 250g package. On a commercial level the seeds can be processed to produce high quality oil, which can be used for cooking and cosmetics, and exported to international markets such as France.

With all the above values at stake, there is a need to understand the underlying ecological processes driving the survival of this endemic species, to ensure its conservation. In the end people will conserve what they know, and know what they are told. So, the story of the !nara as keystone species of the Namib Desert should be one of the widely-told stories to ensure its value is recognized.

Cape Ground Squirrels—another possible keystone species

Corris Magnus Kaapehi, Intern

Cape Ground Squirrels (*Xerus inauris*) occur throughout Namibia, excluding the Northeastern part of the country where there is high rainfall and dense vegetation. These squirrel species dig and live in extensive burrow systems with a depth of 1-2 metres. They persist all year round. Grasses are removed in the immediate burrow area for nesting materials and increased visibility against predators. Foraging activities involve moderate digging of soil substrate for seeds and other food materials. Soil dug from burrows form mounds of heaped sand at the burrow entrance, which serves to prevent flooding of the burrows.

In a study I conducted for my B-tech thesis, I wanted to determine whether Cape Ground Squirrels are keystone species. The study was conducted in the pro-Namib region of Namibia (Namib Rand Nature Reserve) over two seasons, winter and summer. The aim of the study was to look at the effect of Cape Ground Squirrel's foraging activities and burrow presences on the diversity, composition and abundance of other small mammals (e.g. gerbils) occurring at the burrow areas or colonies. The study compared two areas: ground squirrel burrows and a control area, without squirrel burrows.

The preliminary results indicate significant differences between the vegetation cover at burrow areas. During winter, burrow areas were mainly bare, while in summer they were dominated by annual plants such as herbs. The control areas on the other hand were dominated by perennial plants throughout the year, such as grasses. This indicates that the presence of burrows combined with the squirrel foraging activities could be influencing secondary succession, thus altering the ratio of annuals to perennial plants.

In addition, the results indicate a significantly high number of small mammals at burrow areas in summer. This implies that burrow areas could be affecting the seasonal distribution of small mammal populations as there was no significant difference in winter. The deep and extensive burrows of squirrels may serve to provide shelter against extreme temperatures, predators as well as flush floods that may affect the burrows of small mammal, specifically during the rainy season.



Occasional flood that effect small mammals burrows (Continued on next column)

This result also ties in neatly with high cover of annual plants in summer at burrow areas, which could be favoured food source of small mammals in summer.

Given such results, one can almost certainly say that Ground Squirrels are worth the consideration as keystone species. However, before labeling this species as keystone, further research should be done to determine the degree of influence they exert on the environment.



Ground Squirrel foraging

Key key

Joh Henschel, Executive Director

A “key” characteristic of a key is that it enables what is otherwise impossible. A key is the first thing we look for when we want to achieve something. This is why we talk about keystone species, key species, flagship species or even just iconic species. An **iconic species** is what people consider standing for something, often encapsulating a whole microcosm. An icon need not have real meaning; it represents something in our minds. A **flagship species** is also iconic but has real meaning; it is what people identify first in an ecosystem from a complexity of different features. A flagship is usually important in that system, but need not be the most important, it is just a functional feature that people can easily identify with. Managing flagship species normally also takes care of many other species.

A **key species** is definitely important in an ecosystem and plays a key role or occupies a key niche. We immediately think about organisms that perform important ecosystem services. And a **keystone species**: well that is a key species on which the characteristics of an ecosystem depend. Keystones structure biotic communities, regulate rates of ecosystem processes, structure landscapes or serve as essential links in food webs. Most of the structural and functional properties of desert ecosystems are dependent upon only a few keystone species; the others are “hitchhikers”, whether they are key, flagship, iconic, or just ordinary organisms. Take away a keystone, even one, and the entire system changes. Introduce a keystone (as during restoration), and a lot of other things follow. Some keystone species are not iconic, e.g. cyanobacteria are difficult for the public to picture. Other keystones are out there for all to see, and, to boot, they play key roles, are ideal flagships, and iconic. Take the **!nara**.

A Keystone of Learning: GTRIP-the (New) Gobabeb Training and Research Internship Programme

James Anderson, Training Facilitator

According to research, the seeds of the unique desert melon called the !nara (*Acanthosicyos horridus*) require very special conditions to germinate. The temperature, shade, amount of water, and length of dormancy all need to be just right. When the environment is favorable, however, the seed can produce a large, thorny plant that can live over one hundred years and support countless other organisms- it is what we call a keystone species.

Gobabeb is interested in the !nara because of its importance to the local ecosystems and the well-being of the Topnaar people, who traditionally harvest the fruit. Of course, Gobabeb also has an interest in the well-being and development of Namibia and the SADC region overall. In order to achieve this, we need to plant seeds of a very different sort.

We are talking about are the seeds of knowledge, and Gobabeb has been planting these in Namibia's brightest young students for

years through its internship and in-service study programmes. Interns at Gobabeb typically assist in research projects from monitoring beetle populations to collecting fog-water, as well as managing diverse station projects.



Alicia stirring !nara pup during a fieldwork excursion at Naraville.

For the past four years, the Polytechnic of Namibia has also sent students to Gobabeb to gain practical experience in the fields of research, resource conservation, and agriculture through the GIST programme (Gobabeb In-Service Training.) This programme offers students both the experience of conducting research projects and receiving training in scientific methods, statistics, and writing skills.

Both the internship and GIST programmes have been very successful and are key features of Gobabeb's training and research. However, just as scientists search for better ways to germinate !nara seeds, we are always trying to improve the conditions for learning at Gobabeb. Out of this desire to provide the best training possible, the new Gobabeb Training and Research Internship Programme (GTRIP) was born.

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Combining the hands-on project experience of a Gobabeb internship with the high-quality training and research of the GIST programme, GTRIP integrates the two programmes into one six-month experience. Both current Poly students and from any tertiary institutions alumni will be included.

GTRIP started on January 19th this year with a new feature: a month-long training course that allows the students to learn about the Namib, to build the skills necessary for scientific inquiry, and to develop ideas and proposals for their research projects. The orientation includes lectures by visiting scientists and professionals, workshops on arthropod identification, excursions to sites of ecological importance, and a week-long science "boot camp" that includes a chance to harvest !nara melons with the Topnaar.

Each GTRIP student will design and implement a 5-month research project, which will be supervised and reviewed by the staff at Gobabeb. The research may be ecological, social, or agricultural, but should somehow relate to Gobabeb's 2009 "Year of the !Nara": a year-long celebration of an important desert organism. Each project will culminate in a presentation, as well as inclusion of the final papers in Gobabeb's extensive arid ecology library. Students will also assist with a variety of station duties, from collecting data at Gobabeb's first-order weather station to teaching visiting learners about arid environments.

Five participants have been selected for 2009's inaugural GTRIP. Oliver Rumb and Stephen Hidinua will be joining GTRIP in completion of their in-service requirement for Agriculture degrees from the Polytechnic. Victoria Shifidi and Jesaya Nakanyala are alumni of the Geography department at UNAM and both became interested during UNAM's July field course at Gobabeb. Alicia Mushaukwa is a recent Polytechnic alumna who brings a diploma in Land Use to the programme.



GTRIP participants, from left: Stephen, Alicia, Olivier, Victoria & Jesaya

With a roster of excellent students, a syllabus full of challenging ideas, and a team of experienced trainers, the conditions are just right for germination. GTRIP is not a project that will completely terminate in six-months, but will have effects far beyond its time and place. Knowledge can serve as a keystone just as well as any organism-it can support a better and more sustainable future.

Overpowered by males? The story of seven boys and two girls at Gobabeb

Viv Ward, Gobabeb's Associate

Yes, we are talking about interns at Gobabeb, those who came and went in the last part of 2008. Seven males applied, certainly a different configuration to our usual largely female flavour at Gobabeb. We already had a large male contingent among our long-term interns and junior staff who share the communal facilities with the short-term interns. So we imagined the workplace and the communal housing (called Old House) becoming rather rowdy with such preponderance of deep-voiced people! However, while there certainly was a different buzz about the place, it was a lively, uncomplicated buzz. Everyone threw themselves into the work at hand, noisily asking lots of questions because, as always, there is so much disjointed information for the newcomer to wade through before making sense of the mountain of desert knowledge. And then, as evening approached, the station would become quiet, and a new noise would start up in the distance ... aha, the thump of the soccer ball, laughter and shouting, splashing in the pool. Yes, these boys knew how to have fun. Their team spirit encompassed all the Gobabebians who wanted to join, and many a happy sundowner was highlighted by slipface-jumping competitions and accompanying laughter.

So who were these lively interns?



The Dunejumping competition, from left:Maik, Steffen & Kansius

Well, two of them (Syson Ntema and Kansius Gideon) came from the Polytechnic of Namibia as part of Gobabeb In-Service Training (GIST). Syson did a short study on growth rates of wild tobacco and water availability. Kansius examined water usage and conservation at Gobabeb and at two Topnaar villages. These two students were so eager to learn, and their knowledge of their environment improved so much ...in fact they are part of the inspiration for the new improved Gobabeb Training Research Internship Programme (GTRIP).

Three interns, namely Maik Tiedeman, Florian Krau and Steffen Poetsch all came from Germany. Maik focused his study on golden moles, investigating the influence that moonlight has on its foraging behaviour during the night, only to find that a lot more data needs to be collected before drawing conclusions.

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Florian formalised a bird observation system, introducing and testing a new method to monitor changes in species composition and population size over time. Steffen took on the geology module of education, and distilled out the essence of basic general and regional geology. He also got the interns digitising historical weather data, an arduous task which he managed with charm and humour.

And then there was a Dane. Kasper Nørgaard came ostensibly to assist his uncle, Thomas Nørgaard with his research on White Lady Spiders' ability to navigate in the dark. But Kasper got roped into many other activities, making maps and helping set up brochures, always willing and efficient.

Mitch Madumbi, a UNAM graduate, took on the daunting task of compiling the first comprehensive beetle guide at Gobabeb. This task required huge perseverance as information is so scattered, but Mitch's determination saw him through.

And as for the two girls... well Rebecca Helm (USA), the epitomy of dedicated energy, jumped right into the huge task of designing and compiling 17 posters to replace the tatty displays in the Gobabeb lounge. Nicola Ward (SA), actually preferring city life to the isolation of desert living, got swept up in training programmes and soon realised that she could enjoy the buzz of Gobabeb, the visiting school groups and the wide-open spaces, after all.

Apart from individual projects, these seven boys and two girls had other duties around the station too. Together with the long-term German intern, Daniel Kurz, they monitored weather and pit-traps and spider populations. They worked with the training staff, introducing groups of school and university students to the wonders of the desert. They compiled teaching materials, they uploaded information onto Gobapedia. And they all learnt to greet in different languages, thanks to Daniel's cultural programme. (Kai) âios. - (Many) thanks.

And so these adventurers from around the world have dispersed to continue their exciting lives, the richer for having lived in our desert oasis. And believe it or not, most of the newcomers are male too, but more about them in the next issue...among the !nara thorns...



Florian & Steffen



Rebecca



Mitch & Maik

LRT program—a remarkable adventure in Iceland!

Emily Mutota, Acting Outreach Coordinator & Taimi Kapalanga, Data Management Technician

In April 2008, we (Taimi and Emily) had an opportunity to participate in the Icelandic Land Restoration Training (LRT) programme for six months, together with Shoopola Rabanus, also from Namibia, Joel Owana and Moses Opio both from Uganda, and Boloormaa Bataar from Mongolia. The programme was initiated by the Ministry of Foreign Affairs of Iceland and implemented by the Agricultural University of Iceland and the Soil conservation Service of Iceland. This program is part of the Icelandic government's efforts for development and co-operation with developing countries that are affected by land degradation. Its aim is to contribute to poverty eradication and environmental sustainability in developing countries through training and education of professionals in areas related to desertification and land degradation. LRT is a continuous programme; the participation of Namibians in it will not end with us. Last November, the LRT manager, Dr. Ingabjorg Svava Jonsdottir traveled to Namibia to identify future candidates. It is hoped that by next year, the LRT will be part of the United Nations University programme, as it is intended to be. More information about the programme can be found on www.lbhi.is.

LRT is designed to explore and find solutions to the challenges that hamper land restoration. The intensive programme consists of introductory lectures, excursions, practical fieldwork and individual project work. Each of us conducted an individual project that addresses, direct or indirect; the problems faced by our countries and are relevant to our field of work.

Our projects had to be relevant to our organization's mission as well as to restoring degraded land and enhancing sustainable practices. Thus we divided our focus, with Taimi doing a research-oriented project and Emily doing an awareness creating project. Our projects were:

1) Taimi: Review of Land Degradation Assessment Methods. This paper explores and reviews existing land degradation assessment methods and approaches used at global, national, local & farm level and then recommends possible approaches for Namibia's environment.

2) Emily: The feasibility of establishing an International Year of Landcare. The report reviews the concept of the Landcare approach and the value of establishing an international year. In addition, the report outlines possible goals, activities, as well as the support needed to facilitate the planning of the year before submitting a proposal to the United Nations General Assembly.

***The two reports are available on www.lbhi/lrt.is.*

In addition, we were exposed to global environmental issues and restoration, through interaction (mostly in conferences and lectures) with people from different countries in the world. We also learnt about different cultures. The entire trip and stay in Iceland was a remarkable adventure!

Upon arrival and throughout our stay, we were given the best hospitality. Icelanders have a culture of welcoming that makes one feel at home within a minute.

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On most occasions we were invited to family gatherings, where we had the pleasure to enjoy the delicious dry-salted fish, raw Salmon fish, rotten shark - amongst others. "Friends you are welcome, please destroy the enemies", that is the phrase used by Dr. Sveinn Runólfsson (the Director of Soil Conservation Service), whenever he welcomed us to many dinners we had at Gunnarsholt. We also had the privilege to attend some popular Icelandic celebrations, such as the first day of summer, National/ Independence Day, Seafarers (Sjómanna dagur) Day, Farmers Day and even weird, yet-fun Gay Parade. These festivals and others allowed us to learn more about the interesting culture and history of Iceland. Iceland has a bold history. We learnt about the way Icelandic people, also known as Vikings, settled on the island, and the way they survived the erupting volcanoes, floods and many years of cold. One of the incredible, yet fascinating myths is the so-called "loud-screaming noise from ice", that occurs when the glaciers and surrounding ice are melting. This noise is believed to be from the tortured souls paying their dues for having lived sinful lives. Some of those souls are said to have been grilled over the fires of Mt. Hekla, a famous constantly-erupting volcano in the south of Iceland.



View of Mt Hekla, from Thringviller National Park (Biggest NP in Iceland)

The stunning scenery of Iceland was another remarkable thing. With huge glaciers, powerful-high waterfalls, ever-running rivers, geothermal springs, erupting geysers, steep basalt mountains and large lava fields, all make the island unique in the world. Iceland's nature is a true heaven-You only have to imagine the country's landscape for a second to see the endless possibilities. For us coming from an arid country in Africa, we were completely overwhelmed, especially by the amounts of flowing water. In Namibia, water in large quantities is feared. The ice wall of the glacier and the flowing streams remind us of the destructive floods back home. However, within a few days we fell in love with the water. Some of the unforgettable moments with water were when we climbed Vatnajökull (Iceland largest glacier) and bathed in the famous blue lagoon, warm natural spring. Walking on the 100-year-old lava field and forested area was wonderful.

Iceland's wide-open spaces offered us a way to appreciate and connect with nature. Appreciation is an important way of overcoming land degradation problems. As LRT participants, we had so much fun, but with a thought in mind of what we can do to ensure that tomorrow's children get the same opportunity of having fun too.

!Nara Cultivation Trial at Gobabeb

Hiskia Mbura, Research Technician



Introduction

The !nara *Acanthosicyos horridus*, is one of the endemic plants of the Namib Desert that holds great potential for development. A study by Henschel et al, 2004 depicted from local knowledge, the values that the plant holds. Exploring and developing the !nara fruits further might play an important role in improving the livelihoods of the Topnaar. Recent trials by the Indigenous Plant Task Team (IPTT) on the use of the !nara seed for fresh pressed (gourmet) oil production for commercial purposes revealed a good quality product potential (Du Plessis, 2007). However, the low volume of seed obtained from wild !nara plants is not enough to sustain the production of oil from the current !nara seed yields. An average volume of 25 000 kg seeds could be obtained in 1975 along the Kuiseb though the volume has decreased to an average 15 000 kg in 1998 (Dausab pers.comm, 2007).

The study on cultivating the !nara plant was then conducted with the hope of encouraging the Topnaar community to explore the potential for increasing the volume of !nara seed.

The aim of the study was to note the development of the !nara seedlings during the early stages of growth. This was done under two water treatments: recycled and tap water. The reused water is the water which went through a purification system after being used in the households. The tap water is one that comes directly from the borehole. The study further looked at controlled and non-controlled temperature condition. In this case some of the seedlings were grown in the net-house and others outside the net-house. The table below shows the experiment design:

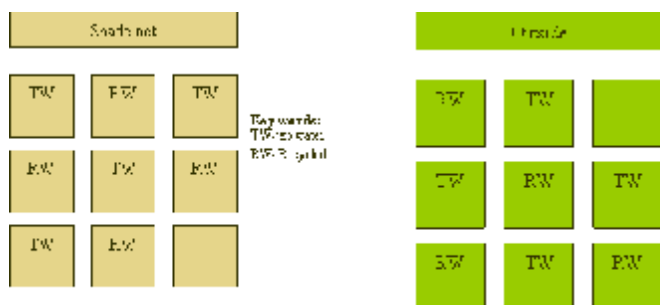


Figure 2: Experiment design

1. Seed Germination

Special attention was paid to the selection of seed; thus only seed of the same harvest was considered. This was to justify the dormancy and encourage even germination. The seeds were germinated under shade net conditions after being soaked for 24 hours (Müller, 2004). Seeds were then sown in plastic pots (5cm diameter) at depth of 4cm. A total of 54 seeds per treatment were sown where 44 (81 %) and 47 (87 %) seeds germinated from both tap water and reused water treatments respectively.

Visual observation on plant development such as root length and tillers were done and noted during all readings. The !Nara seeds started germinating about four days after they were sown, but the shoots were still under the soil surface. On overall germination, no significant difference (T-test p-value of 0.64) was recorded on both water treatments.

The table below shows the growth rate summary and T-test results for the difference between the Shade-net (net-house) and the outside seedlings for growth in terms of height. It is again based on the statistical T-test that there was no significant (P-value = 0.22) difference as far as the water treatment is concerned. The growth rate in the table below are given in centimetres.

	Shade net	Outside	P-value(T - test)
Reused	17,3088	15,31204	0,2432
Tapwater	10,92685	12,35972	

2. Water and Nutrient supplementation

The seedlings were watered with 250 ml water per pot three times a week during germination. The amount was increased to 10 liter water per 1,5m x 1m plot after transplantation. The soil mixture both in the plastic pot and the seedbed was 4:1 parts sand to goat manure spread over the seedbed. There has been no research on the nutrient requirements of the !Nara, thus no specific reference was used.

3. Relationship between seedlings growth and water & temperature treatments.

a. Temperature vs. Growth

According to the Pearson test of correlations (refer to table above), there is a relationship between seedling growth and the temperature with negative figures. The correlation results are based on water treatment grouping vs. temperature and are as follow:

- Tap water vs. temperature: $r = -0.59$
- Reused water vs. temperature: $r = -0.5$

b. Water salinity vs. Growth

The Pearson correlation test for growth (height) vs. water salinity levels also confirmed a positive relationship between the two factors and this is $r = 0.886$ (P-value = 0.11). This indicates that there is a positive correlation between the salinity levels of the two water treatments and the growth.

Conclusions

Having successfully been able to germinate the seedling following scientific methods, the potential for !nara cultivation is confirmed. The question though remains, will the seedling or the cultivated plants bear fruits? This question is yet to be answered through extended research on the !nara..

As per the research objectives, comparisons between the growing conditions did not yield significant results. The !nara seedlings have shown poor germination under temperatures above 30°C but germination was better at different temperatures ranging between 20°C and 30°C. The research also shows that the !nara plant requires enough sunshine though shading is recommended during early development of the seedlings.



The positive relationship between the water salinity and the seedling growth could be a good indicator of plant hardiness. On the other hand it may mean that the nutrient and minerals required by the !nara plant are available at the salinity level that the water offers. This again creates a research question to be explored.

The main message from the study is clear and is that the potential for !nara cultivation must be fully explored to improve the local community's livelihood. With the cultivation of the !nara, the seed harvest volume will be increased thus opening the doors for further development of the !nara fruits. This will create markets at which the harvesters and producer can sell and earn a better income from the !nara.

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**The complete research paper can be found in Library at Gobabeb and can also be provided by author upon request. Email: hiskiam@Gobabeb.org

Species diversity of Lizards & Geckos along the rainfall gradient in Namibia

Taimi Kapalanga, Data Management Technician

How are the lizards and geckos species diversity distributed along the rainfall gradient in Namibia?

The Southern African region is known for its high diversity, richness and endemism of reptiles; about 261 species are known to occur in the region. In Namibia, a country of arid and semi-arid environments, the reptile fauna is well adapted, and at least fifty-five species are classified as endemic. According to Griffin (1998), lizards display the greatest endemism (35% of species are found in Namibia and nowhere else), followed by tortoises (17% endemic) and snakes (11% endemic). Most of the endemic reptiles are found in and around the escarpment zone, particularly in the northeastern regions of Namibia. However, there are also many reptiles in the Namib lowlands, which are associated with rocky and gravel surfaces.

Namibia is composed of a variety of ecosystems with different climatic conditions and land use practices. The environment ranges from cold and desolate coasts to sand dunes, riverbeds, gravel plains, mountains, savannahs, and inselbergs. Namibia's rainfall is erratic and varies from place to place. Each ecosystem encourages the evolution of well-adapted reptiles, like the dune-loving *Merolea anchietae*. However, reptiles may be forced from their preferred habitat due to changing in climates and destructive land-use practices. The underlying question is does varying rainfall distribution affect the species diversity and distribution of lizard and geckos in Namibia?

To gain a better understanding of reptile distribution in Namibia's varied habitats, Sandra Lang (an intern from German) conducted a preliminary study in 2007 on the diversity of lizard and gecko species along rainfall gradients in Namibia under the BIOTA (Biodiversity Monitoring Transect Analysis in Africa) project at Gobabeb Centre. From 2004 to 2007, a total number of 140 lizard and gecko specimens were collected from eleven observatories along the Namibia's rainfall gradients. These comprise 11 species of lizard, 8 of gecko and 1 agama species. Interestingly, the results show higher contrasts of species diversity on a north and south axis (Rundu to Keetmanshop) when compared to east and west transects (near Windhoek to near Walvis Bay).

The study also provided data on the most widespread lizard species such as the skink *Trachylepis occidentalis*, which was collected at five different sites. The most widespread gecko found was *Pachydactylus punctatus*, found at three different sites and the only agama species, *Agama aculeate* was collected at five different study sites. A surprising six species (2 lizards and 4 geckos) were identified as endemic to Namibia, and were found mostly at Ganab and Kleinberg sites in the Namib Nauklift Park.

The study concluded that some of the lizards and gecko species can both have broad habitats that stretch across the rainfall gradient and be incredibly site-specific. The study recommend that further research about the distribution of these special animals can help us preserve the gem that is Namibia's biodiversity.

In the next issue! ...How does rainfall affect the distributions of reptiles along the climate gradient?
c continued on page8

Salt of the Earth, Fruit of the !Nara, Gobabeb of the Namib- An invaluable resource

Louine Boothway, Business Manager

On an unusually muggy November afternoon, in the strictly un air-conditioned training lab during the pre- planning meeting that took place before the Annual Planning Meeting, an extraordinary concept was born. As small contingency of right- brain dominated individuals had managed to infiltrate this inner sanctuary of analytical scientific types and the Gobabeb Staffing Organogram was unceremoniously taken, inverted, planted in the desert sand and in a shower of creativity and inspiration transformed into the !Naramgram!.

Whilst reflecting on key questions such as “who are we?”, “what are we doing?” and “where are we going?” it seemed appropriate to allow our roles to be informed and inspired by the !nara (*Acanthosicyos horridus*), a leafless, thorny cucurbit that is a praised and valued resource of the Namib Desert. While to some it might be a spiny bush, to Gobabeb it has become a worthy role model with an impressive, 8000 year history of supporting human communities. A key stone species with multiple ecological connections, it still plays an integral part in sustaining Topnaar people and culture.

So what does this unique Gobabeb “*FaceBush*” look like? Ultimately responsible for the well being of the plant is the *taproot*. The root facilitates the most important requirement for the !nara plant to flourish by bringing essential groundwater to the surface. Our *Executive Director*, who as a young, starry-eyed student planted his roots deeply in the desert several decades ago, naturally fulfills this role. Critically important, though seldom appreciated as much as the fruit, are *the branches* of the !nara-bush. As a framework for plant activity and fruit development, they use sunshine wisely and reduce loss of precious water through the thick cuticle on the stem, surface waxes and microscopic hairs. In the same way, the *Centre Services Section* provides a structural framework for research and training activities. It demonstrates the sustainable use of resources through alternative energy and appropriate technology and guards against the unnecessary loss of valuable resources.

Solitary bees and *blister beetles* are the most important pollinators. In the same way the *Research Section* plays a crucial role by pollinating i.e. gaining knowledge from the desert environment and applying that for the benefit of the Centre yielding useful outputs. *Jackals* and *Gerbils* are crucial vectors of seed dispersal. Whilst being nurtured by the fruit, they spread the seeds enabling new plants to germinate, grow and bear fruit far from the parent plant. The *Training and Outreach Department* fulfills this very important role. As the !nara faces the challenge of continually adapting and responding to damaging elements such as ever-increasing numbers of donkeys and a changing social, economical and political context, Gobabeb also needs to nurture our capacity to adapt and respond effectively during challenging times.

During 2009 – *the Year of the !nara* - we will continue to learn from this organism: To be rooted in the desert by being true to our mandate to facilitate and conduct research, use our precious resources wisely, work closely with our partners and produce fruit - world-class research and training - that nurtures the Topnaar people, Namibia and the world.

The Kuiseb River Talk

by Taimi Kapalanga

*I am one of twelve west flowing ephemeral rivers in Namibia.
I flow from mountains of the Khomas Hochland
To the valleys far below, then I rumble!
Until I reach the fertile plain
Where I grow the golden grains
Then I chase the silver rain back to the ocean.*

*I am a building block of Namib matter
The heart of Namib Central's life".
I extensively, support abundant life.
Look at the continually green river ecosystem.
Look at the fruitful !Nara plant, the Namib keystone species.!*

*I am so exceptionally, valuable, supportive, and more!
All I need is for you to nourish me!*

Thank you, Financial Partners

Joh Henschel, Gobabeb Executive Director

Nine years of core funding to Gobabeb from the German Ministry of Development Cooperation officially came to an end in 2007. However, Gobabeb continues to have justified reasons to be thankful to financial donors who in 2008 contributed 24% towards our annual income needed to cover expenditure. Following the N\$1.6-million storm damage last year, several private donors, MET, as well as GTZ assisted Gobabeb in our hour of need in addition to insurance cover. In 2008, our corporate donors were Namdeb Diamond Corporation, Walvis Bay Salt Refiners, Reptile Uranium Namibia, Namport, and Pupkewitz Holdings. Bilateral programmes were supported by the BMBF (German Ministry of Education and Research), Finnida, SIDA, USAID and Icelandic Ministry of Foreign Affairs. Several charitable persons gave donations and gifts, while many people gave generously of their time. Seen together with our valuable business partners, who loyally use our facilities or employ our professional expertise, these contributions helped significantly towards financing Gobabeb's training and research programmes in 2008. Given that the Gobabeb Training and Research Centre meets critical public needs with its mandate, continued financial support by appreciative donors and partners will enable us to sustain this through 2009.



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Library Donation

Picture below: Gobabeb's librarian (Mrs. Inge Henschel) gratefully receives a copy of "Heritage and Culture in modern Namibia" for the library by Dr. Beatrice Sandelowsky, (founder of Tucsin), celebrating 30 years of Tucsin. The reports span a time frame of more than 10 million years and cover a large spectrum of world-wide important subjects.

