



May heralded the International Day for Biological Diversity and Seychelles Islands Foundation (SIF) took this opportunity to increase understanding and awareness of issues surrounding biodiversity in Seychelles. At the Vallée de Mai, students from schools on Praslin visited the stewardship plot to learn about the effects of invasive plant species on native biodiversity. The students undertook a survey of the endemic plant seedlings that had previously been planted at the plot. This gave them the chance to participate in some 'research' and gave an idea of how well the plants have adapted to their new environment. Two endemic Palmiste trees were planted by members of the Friends of Vallée de Mai club at Vijay International school in conjunction with SIF, as part of an international 'Green Wave' initiative amongst schools for biodiversity day. The headteacher and a member of the Friends of Vallée de Mai club, expressed their appreciation for these two palms and gave their commitment to take good care of them. Visitors to the Vallée de Mai also had a chance to participate in activities with a number of them playing the guess the weight of the Coco de Mer game with the visitor attendants and having a go at our biodiversity riddle quiz. The Vallée de Mai also received an invitation to plant some seedlings at Raffles Hotel and a total of 20 café maron pti fey were planted by Vallée de Mai staff.

Seychelles' two UNESCO World Heritage Sites, the Vallée de Mai and Aldabra Atoll, hold a wealth of unique biodiversity, and many species are found nowhere else in the world. To celebrate and share knowledge on this biodiversity, in April 2015 SIF were delighted to host two research symposiums; one on Mahé and one at the Vallée de Mai on Praslin. Minister Dogley kindly opened the symposium at the Vallée de Mai, which was the first one to be held on Praslin, in honour of World Heritage Day. The two symposiums presented research and conservation work from both Seychelles' World Heritage Sites, the Vallée de Mai and Aldabra Atoll, and was a chance to share with the wider scientific community and the general public the advances in research that are being made by SIF, and the importance of continuing protection for these sites.

The symposiums were well attended, and with 19 presentation topics a wide range of subjects were covered. To commemorate these symposiums and to share these achievements with those that could not attend, we have compiled this special issue of our newsletter that contains a brief overview of each presentation that was given.





HIGHLIGHTS OF RECENT ALDABRA RESEARCH: FRIGATEBIRD NUMBERS, A RE-DISCOVERED 'EXTINCT' SNAIL, AND ANOTHER INVASIVE SPECIES ERADICATION?

Heather Richards, Shiira Padayachy & Martijn van Dinther

There have been numerous research projects and monitoring programmes undertaken at Aldabra Atoll over the past few years. A selection of some recent research highlights has been included in this presentation. Aldabra's terrestrial ecosystem is dominated by the Aldabra Giant Tortoise (*Aldabrachelys gigantea*), a large herbivorous reptile. Ongoing giant tortoise research in collaboration with the Zurich Aldabra Research Platform (ZARP), a collaboration between researchers at the University of Zurich and SIF, has yielded two years of data from the movement study of 31 GPS-tagged tortoises. This has shown that some individuals remain in a small area throughout the year and others make longer migratory movements to different areas. Enclosure and control plots have been set up on East Grande Terre to study changes in vegetation over time in tortoise grazed and non-grazed areas. Assessment of tortoise numbers on the 12 fixed transects around the atoll since 1998 has shown that overall the population has remained stable over this period.

Another highlight has been the deployment of eight satellite tags on female Green Turtles (*Chelonia mydas*) between 2011 and 2013. These turtles were found to travel to feeding grounds on the coastline of Tanzania, Kenya, Somalia, Madagascar whilst one stayed closer to home and migrated to the inner islands of Seychelles. This movement data has provided a valuable insight into the Aldabra Green Turtle range and a better understanding of the threats they might face when away from Aldabra.

To learn more where Aldabra's breeding tropicbirds go when away from Aldabra, 10 geolocator loggers were attached to Red-tailed Tropicbirds (*Phaethon rubricauda*) breeding on Aldabra in 2012. One logger retrieved in 2013 showed that the bird had flown nearly 3000 km east to the Chagos Islands area before returning to Aldabra, a round trip of some 5700 km!

Since 2011 an annual census has been undertaken of Aldabra's four frigatebird colonies, counting nesting pairs of both Lesser and Greater frigatebirds (*Fregata ariel* and *F. minor*) and chicks still on nests. The surveys allow a comparison of the number of breeding frigatebirds across the years. With the fifth annual survey some interesting patterns are emerging and annual fluctuations in the numbers of breeding frigatebirds are clear, with 2011, 2013 and 2015 having more breeding birds than 2012 and 2014. This could be a result of the long breeding cycle of frigatebirds with neither species breeding on an annual cycle or it may be related to fluctuations in feeding resources.

Eradication of the invasive sisal (*Agave sisalana*) plant from Aldabra is almost complete, with all populations having been managed and adult plants treated in 2014. There is still some regrowth of small plants, so follow up monitoring will be continued in 2015 with the hope that Aldabra will be declared sisal free at the end of the year.

Following the very exciting re-discovery of the Aldabra Banded Snail (*Rhachistia aldabrae*) in August 2014, which was declared extinct by Dr Justin Gerlach in 2007, surveys at the site have identified >40 individuals, primarily on endemic trees. Most individuals were found in their dormant state although some were also active. Only a small area of this site has been surveyed, and follow up monitoring is planned.

Even basic monitoring and research on Aldabra is difficult because of the many logistical challenges. These results are due to a huge team effort, between the Aldabra team, the wider SIF staff, partners, collaborators and funders both in the Seychelles and internationally.



THE NEW ALDABRA MARINE MONITORING PROGRAMME: WHAT CAN IT TELL US?

Philip Haupt & Daig Romain

In 2012/2013 Aldabra's seaward reef was mapped, and the abundance and distribution of 11 habitat types were determined. The reef map identified 3.5 km² of unprotected coral reef, which validated the need to expand the current 1 km boundary Marine Protected Area (MPA) around Aldabra. A larger area that extends to the 3 km depth contour was nominated to the Government of Seychelles for MPA expansion.

In 2012 SIF reflected on Aldabra's World Heritage Site values and the threats they face to determine the objectives for a marine monitoring programme. Subsequently the Aldabra Marine Monitoring Programme was started in 2013. This was funded by the Government of Seychelles-UNDP-GEF's "Protected Areas" project. The programme includes both the Aldabra Reef Monitoring and Baited Remote Underwater Video systems (BRUVs).



Undertaking surveys to monitor seabed cover at Aldabra

The Aldabra Reef monitoring programme was established to evaluate the reef's health and quantify changes over time. It uses SCUBA divers to monitor seabed cover and fish abundance at 12 fixed sites. Initial results show that hard coral cover is increasing, and that there is a high abundance of small herbivorous fish (<10 cm), and large (> 40 cm) piscivores. BRUVs are used to monitor fish populations at different depths and habitats. Analysis has shown that large piscivores are abundant, with reef sharks and large groupers dominating the ecosystem. The results so far indicate that Aldabra has a healthy marine ecosystem, and provide SIF with a baseline to detect future changes to coral and fish communities.



PROGRESS WITH REALISING ALDABRA HOUSE

Christina Quanz

SIF has set out on the challenging journey of bringing the experience of Aldabra Atoll to Mahé through the planned visitor centre, 'Aldabra House'. The aim of Aldabra House is to provide a modern, exciting, world class visitor attraction that will amaze the senses and capture visitors' attention with its interactive and immersive audio visual experience.



Aldabra House will bring the experience of this unique atoll to Mahé

Aldabra's remote location makes it logistically and financially challenging to visit. The Aldabra House visitor centre will give everybody the opportunity to discover the atoll, not only to see it but also to feel, taste, smell and hear it.

One aim of Aldabra House is to help diversify sustainable financing mechanisms for Aldabra and reduce the dependency of its operations on the revenue collected at the Vallée de Mai. In addition the new centre is hoped to increase public engagement by creating a tourism attraction that will include a restaurant, public talks, conference facilities and a small library. It will further provide sufficient office and storage facilities for SIF and be an innovative building which integrates available

renewable energies, energy efficiency measures and sustainable architecture.



THE STORY OF THE WORLD'S LARGEST SUCCESSFUL INTRODUCED BIRD ERADICATION: ASSUMPTION

Jessica Moumou, Nick Page & Dr Nancy Bunbury

The invasive bird eradication on Assumption Island, funded by the European Union, began in October 2011 and aimed to eradicate the introduced Red-whiskered Bulbul (*Pycnonotus jocosus*) and Madagascar Fody (*Foudia madagascariensis*) to prevent them from colonising Aldabra which is less than 30 km away.

Assumption has a history of guano mining and several invasive bird species were kept as pets in the 1970s. These birds were either released or escaped and their numbers then increased rapidly. An SIF census in October 2011 recorded an estimated 3000-6000 Red-whiskered Bulebuls and 1200-2000 Madagascar Fodies. The birds were continuously monitored and various methods were trialed for the eradication, with mist-netting initially found to be the most effective capture technique.

As bird numbers gradually decreased, mist-netting became less effective and the team switched to shooting in the later stages of the eradication. In total, over 8000 introduced birds were targeted in this eradication, with mist-netting accounting for approximately 80% of this number. Eventually, after several months of there being only two Red-whiskered Bulebuls and a handful of Madagascar Fodies, the last Red-whiskered Bulbul was finally shot in December 2014, and the last known Madagascar Fody in January 2015.



Sampling Red-whiskered Bulebuls caught on Assumption

After several weeks of intensive monitoring the Red-whiskered Bulbul was confirmed eradicated from Assumption in February.

This not only makes it a national eradication, since Assumption was the only island on which it still occurred (the same species was eradicated from Aldabra in 2013), but it is to date the largest known successful invasive avian eradication and the first large-scale eradication of this particular invasive species. The Madagascar Fody eradication is not yet considered complete as further monitoring is required for the next 12 months, but we hope to be able to announce its successful eradication soon.



JUST IN TIME? REMOVING RECENTLY INTRODUCED BIRDS FROM ALDABRA

Terence Mahoune & Stephanie Marie

The presence of the invasive Madagascar Fody (*Foudia madagascariensis*) and Red-whiskered Bulbul (*Pycnonotus jocosus*) on Aldabra was confirmed at Takamaka, in the east of the atoll in 2012. These birds were thought to have flown from the introduced populations on nearby Assumption Island. The single Red-whiskered Bulbul was eradicated in 2013 but the population of Madagascar Fodies was estimated at 100–200 birds and required a larger eradication programme.



Mist nets in position at Takamaka

The Madagascar Fody poses a direct threat to Aldabra's avifauna, particularly the endemic Aldabra Fody (*Foudia aldabrana*), through competition, hybridisation and disease. An eradication programme of these birds therefore began in 2012, soon after their discovery. The preliminary work consisted of surveys of the area, mapping territories and trying to identify potential fody hybrids or associations with Aldabra Fodies, none of which were confirmed at the time. A field hut was built the same year to enable a permanent presence at Takamaka.

Throughout 2013 and 2014 mist-netting and shooting were used as the main targeting methods for the introduced fodies, with all birds carefully measured, photographed and sampled for recording purposes. The eradication operation was restricted to the breeding season, which is when birds are more easily identified and distinguished from Aldabra Fodies due to their breeding plumage. By the end of the 2015 breeding season, there was thought to be only one remaining male Madagascar Fody remaining on Aldabra, which will be followed up in the next breeding season in order to remove this threat to the Aldabra Fody.



USING GENETICS AS A CONSERVATION TOOL: ARE MADAGASCAR AND ALDABRA FODIES HYBRIDISING? AND IS THE ALDABRA RAIL A DISTINCT SPECIES?

Dr Janske van de Crommenacker

Phylogenetic studies of two of Aldabra's endemic landbirds, the Aldabra Fody (*Foudia eminentissima aldabrana*) and the Aldabra Rail (*Dryolimnas cuvieri aldabranus*), were conducted to help formulate and inform conservation strategies for these birds.

The first main objective of the research was to re-assess the taxonomic status of the Aldabra Rail and the Aldabra Fody to determine whether they can be re-classified as distinct species rather than sub-species. Such distinctions are valuable for securing funding and protection for these species. The study is ongoing for the rails, but for the fodies, it was confirmed that the bird should be treated as a distinct species, i.e. *Foudia aldabrana* instead of *Foudia eminentissima aldabrana*.

Secondly, the impact of the population of invasive Madagascar Fodies on Aldabra was studied. It was suspected that this invasive bird had hybridized with Aldabra Fodies, which could potentially dilute the genetic structure of this species. The research confirmed that the Madagascar Fodies on Aldabra had arrived from Assumption, and that hybridization between the two species had occurred recently in the Takamaka birds. It seems likely that the arrival of Madagascar Fodies on Aldabra pre-dated eradication activities on Assumption as the population was well established upon its discovery in 2012. The birds' detection on Aldabra in 2012 was probably due to increased monitoring in this area at the time. The study thereby confirmed that the eradication of Madagascar Fodies and suspected hybrids on Aldabra is an appropriate management strategy, as the birds originated from Assumption and were not a natural colonisation.



The invasive Madagascar Fody (left) threatens the Aldabra Fody (right)

This study is an important example of how conservation genetics can be integrated into conservation management and decision-making.



ALDABRA MANAGEMENT INTO THE FUTURE

Dr Frauke Fleischer-Dogley

A management plan is important to ensure that an organisation has clear guidelines to follow, and reflect upon, to evaluate its own performance, report thereon, and make strategic adjustments to ensure the smooth running and objective driven outcomes in the long run. A new management plan is also required for Aldabra Atoll to reflect current knowledge, updated technologies and management techniques, revised management situation, and priorities. The Seychelles Government and UNESCO World Heritage Site body also requires site managers of protected areas to have updated management plans in place. Under funding from GEF, SIF were able to produce a new management plan.



Aldabra Atoll, a UNESCO World Heritage Site

The plan will have an outcome-based approach to allow for adaptive management and clear key performance indicators, targets will also be linked to the values of the site. Core elements will include policy guidance, risk assessment, key management priorities, and a framework to assess management performance. The plan will also need to address some important issues; the extension of the marine protected area boundary, the review of the 'vision' for Aldabra, review of the strategic objectives, incorporation of World Heritage outstanding universal values, management zoning of the protected area, and a policy for tourism activities.

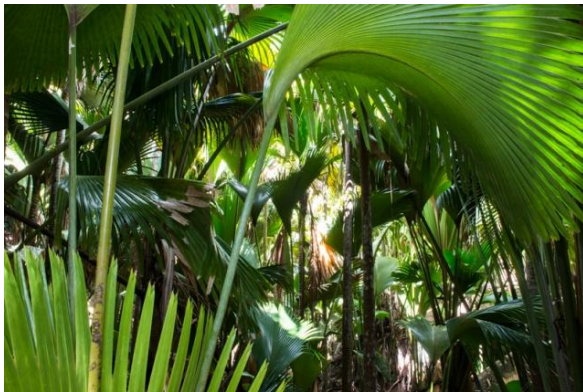
The management plan has been developed with the input and assistance of staff members at Aldabra and head office. Input from other stakeholders is also valued and this will be addressed later in 2015.



VALLÉE DE MAI AND WORLD HERITAGE

Marc Jean-Baptiste

A UNESCO World Heritage Site is a place that has cultural and/or natural significance and is of international importance to preserve for future generations worldwide. Every UNESCO site has what are described as 'Outstanding Universal Values' that guide the UNESCO committee to designate the site as World Heritage.



Vallée de Mai, a UNESCO World Heritage Site

A site must meet at least one of ten selection criteria in order to be nominated and the Vallée de Mai meets four of these: **Criterion (vii)** refers to the superlative natural phenomena or natural beauty of the site; **Criterion (viii)** refers to the Earth's history, and geological and geomorphic features and processes of the site; **Criterion (ix)** refers to the ongoing biological and ecological processes that occur at the site; and **Criterion (x)** refers to the biological diversity and threatened species that occur at the site.

SIF undertakes several actions to protect, manage and enhance the Vallée de Mai's outstanding universal values including a scientific research programme, management of threats such as poaching and fire, an education and awareness programme, sustainable tourism activities to generate long-term financing for the site, and adherence to strict regulations and legislation of the site and its species.



OVERVIEW OF RESEARCH AT THE VALLÉE DE MAI

Wilna Accouche

In 2009 SIF established a long-term monitoring and research programme at the Vallée de Mai. Previously overshadowed by Seychelles' other UNESCO World Heritage Site, Aldabra Atoll, the Vallée de Mai has proved to be a treasure trove of scientific interest and value, and many of its secrets are still being discovered. Collaborations with international academic institutions have been invaluable in the progression and quality of this research.

The research programme has focussed on the Vallée de Mai's flagship species – the Coco de Mer (*Lodoicea maldivica*), Seychelles Black Parrot (*Coracopsis barklyi*), Sooglossid Frogs (*Sooglossus* sp.), Giant Bronze Gecko (*Ailuronyx trachygaster*), and Seychelles Chameleon (*Archaius scychellensis*). To date there have been four scientific publications on the Coco de Mer, collaborating with researchers at the ETH Zurich in Switzerland, with several more in the pipeline. Research on this iconic species has so far focussed on sustainable management, reproduction, pollination and genetic distribution.



Taking measurements of a Seychelles Black Parrot fledgling in the Vallée de Mai

Six Seychelles Black Parrot breeding seasons have now been monitored, with valuable data collected on their feeding and breeding ecology, as well as research into their population size and phylogenetic status. SIF has collaborated with four universities on this research, including four MSc students, one PhD student and three external researchers.

In 2009 a new population of sooglossid frogs was discovered in the Vallée de Mai, a group of frogs previously only known from Mahé and Silhouette. In collaboration with the University of Kent, two MSc students and one PhD student have conducted research into the distribution, genetic structure, and vocalisations of these frogs, with the aim of understanding their ecology on Praslin and establishing their genetic status. To date two scientific papers have been published on this research.

The Giant Bronze Gecko is now thought to be endemic to mature Coco de Mer forest and there is still much to learn about its behaviour and ecology. Research has been started into its distribution, population status, movement ecology, potential role in Coco de Mer pollination and feeding ecology, in collaboration with several research partners, resulting in two MSc students so far and more research planned.

The Seychelles Chameleon was re-discovered in 2009 after being lost to science for over 150 years. With support from the Durrell Wildlife Conservation Trust and the American Museum of Natural History, research into the distribution and morphology of the two chameleon species is being conducted and should be published soon.



STEPS TOWARDS AGING COCO DE MER THROUGH LEAF GROWTH RESEARCH

Annabelle Constance

The iconic Coco de Mer (*Lodoicea maldivica*) has among the longest petioles of any flowering plant. For her BSc dissertation in Environmental Sciences at the University of Seychelles, Annabelle researched how the Coco de Mer grows such long leaves and whether leaf growth is affected by climate conditions. Leaf growth rates of Coco de Mer were determined using 5 years of data collected by SIF and Annabelle then investigated whether these rates changed with: (1) development stage of the plant (seedling, immature, juvenile, adult); and (2) seasonal rainfall. To evaluate long-term response of Coco de Mer to changing climatic conditions, Annabelle also assessed annual changes in leaf growth.

Coco de Mer leaf growth rates were higher in individuals approaching reproductive maturity, and subsequently decreased in reproductive individuals. Results were discussed in the context of investment priorities of the palm at different development stages. Seedlings initially depend on food reserves in the seed, but as the palm grows and 'detaches' from the seed, its survival increasingly relies on external resources. Since light is commonly the limiting factor in tropical forests, it appears that young trees invest heavily in rapid leaf growth to reach and exploit light. The higher resource requirement of reproduction might then account for leaf growth slowing down at the adult stage.

Coco de Mer is also affected by seasonal changes in rainfall availability as leaf growth rates were consistently higher during the wet season. Despite annual climatic extremes during the study period, annual leaf growth rates did not differ significantly. That the patterns of inter-year leaf growth of Coco de Mer are relatively constant demonstrates the inherent resilience of the palm to climatic variability. However, with projections of a much warmer and wetter climate for Seychelles, seasonal scarcity of resources is expected to worsen. It is therefore of great importance for growth in this iconic species to be continuously monitored.



Conducting the Coco de Mer growth monitoring



HOW COCO DE MER SOLVES THE PARADOX OF PRODUCING HUGE SEEDS

DESPITE POOR SOILS

Dr Christopher Kaiser-Bunbury

The iconic Coco de Mer palm (*Lodoicea maldivica*) grows in extremely nutrient-poor soils, yet females are able to bear the largest seeds in the plant kingdom while males produce huge amounts of pollen. How do these palms obtain the nutrients they need to support such a large investment in reproduction? We measured the amount of nitrogen and phosphorus used for growth and reproduction by *Lodoicea* in the Vallée de Mai on Praslin. We also recorded soil nutrients and the quantity of water flowing down the trunk during rain showers. We showed that the nutrient costs of reproduction are very high in both male and female Coco de Mers; phosphorus use is up to seven times greater in reproduction than in growth. We also showed that *Lodoicea* leaves act as huge funnels, channelling 95–98% of rainwater falling on Coco de Mer forests to the base of their trunks. Any organic debris settled on the leaf surface also gets flushed to the bottom of the tree by rainwater, effectively recycling the nutrients and partially explaining the large nutrient supply. In this way, *Lodoicea* is able to improve its own nutrient supply and that of its dispersal-limited offspring. We discussed how this funnelling process, and its effect on soil conditions, has shaped the ecology and life history of *Lodoicea*, and also of a remarkable community of animals that are found only in *Lodoicea* forests.



The Coco de Mer's large leaves act as huge funnels

Citation:

Edwards PJ, Fleischer-Dogley F, Kaiser-Bunbury CN. 2015. The nutrient economy of *Lodoicea maldivica*, a monodominant palm producing the world's largest seed. *New Phytologist*, 206: 990-999.



COCO DE MER: TRANSLATING RESEARCH INTO MANAGEMENT

Mariette Dine

The Coco de Mer (*Lodoicea maldivica*) is a flagship and keystone species of the Vallée de Mai. Research on its lifecycle, conditions need for growth and interactions with other species help guide the protection and management of this endemic species.

Regular growth monitoring of the Coco de Mer has provided information on how long it takes for a leaf to emerge, grow and die, whether there is any difference in growth between different age categories, if growth is affected by climate, and a more accurate age estimation of trees. Growth monitoring is conducted every 3 or 6 months, and markings are measured on 15 selected trees in each growth stage: seedlings, juveniles, immatures and adults.



Reproductive monitoring is conducted on the male Coco de Mer catkins

Reproductive monitoring is also done every 6 months with the number of catkins and nuts counted on 15 males and females. This research provides information on flowering seasonality and the rate of nut production. Both the reproduction and growth monitoring are long-term research programmes, helping us to understand more about Coco de Mer biology and how quickly the forest can regenerate.

In addition, to assist in management of the Coco de Mer, all mature trees have been marked and mapped. Data are also collected on all nuts harvested from the Vallée de Mai for sale including the number of nuts and their mother tree.



RAISING AWARENESS THROUGH EDUCATION AND OUTREACH

Maria Brioche

To strengthen efforts being made in research and conservation work at the Vallée de Mai, SIF employed an education and outreach officer for the site in 2011. The aim of this programme in the Vallée de Mai was to raise awareness of the values and importance of Seychelles' two UNESCO World Heritage Sites amongst visitors and Seychellois.

The education officer assists in the coordination and facilitation of activities of the 'Friends of Vallée de Mai' school club, of which there are 126 members in the four schools on Praslin in 2015. Presentations are conducted in schools on Praslin and Mahé by the education officer on a variety of topics (42 school presentations have been conducted since 2013). SIF also organise school competitions, school visits to the Vallée de Mai and the twice yearly SIF holiday camp which has so far reached 180 primary school children. There have also been 34 outreach events organised or attended by SIF since 2013 in celebration of international environment theme days, reaching around 5500 people. SIF has participated in several national events where we have been able to engage the public on key issues, and provide general information on the Vallée de Mai and Aldabra Atoll.



Inspiring the conservationists of tomorrow through the SIF holiday camp programme



RECENT RESULTS FROM THE SEYCHELLES BLACK PARROT BREEDING RESEARCH

Terence Payet & Dillys Pouponeau

In 2014 two scientific papers were published on the breeding and feeding ecology of the Seychelles Black Parrot (*Coracopsis barklyi*). The paper on breeding ecology summarised the results of 5 consecutive years of monitoring black parrot breeding seasons including findings on their unusual reproductive ecology. During the breeding season the females undergo several changes; their beak lightens and each female has an individual call that they use to attract males and to be recognized by their young. Unusually, black parrots can mate in a side-by-side position with a tube connecting their cloacae. Females can have two to three males per nest and can lay between one and four eggs. Only the female incubates eggs and feeds the chicks.

In the sixth breeding season (2014-2015) the team focussed their research on three locations - Zimbabwe, Fond Ferdinand, and Vallée de Mai and surroundings. The main aim of the season was to locate as many nests as possible to determine black parrot nesting distribution and breeding success in different areas. All potential and active nest sites found in this season were mapped and for the first time two nests were found in live trees rather than standing dead trunks. Active nests were monitored using an infrared camera, ladders and an access door to reach the eggs or chicks inside. Eggs are checked regularly and if they hatch, the chick is monitored and weighed every few days to track their growth. If an egg or chick dies, possible causes are recorded. The chicks are ringed at 35 days old with a unique colour combination and then monitored after fledging until they are no longer dependent on their parents.

We found more active nests this season compared to previous seasons, with 25 nests monitored and 13 chicks fledged. Two nests contained four eggs, which is uncommon. Despite this success more nests do not necessarily mean more chicks, however, as various factors can affect breeding success. In one case, a camera trap confirmed that feral cats were preying on chicks/eggs.

The feeding ecology research has found that black parrot feeds on more than 50 plant species and prefers endemic palms to introduced plants. In addition to research on breeding and feeding, genetic analysis conducted in collaboration with the University of Kent led to the declaration of the Seychelles Black Parrot as a distinct species in 2014.

In 2014 a survey was conducted on Praslin to find out more about the Praslinois perceptions of the black parrot and guide conservation actions. 181 people were interviewed (including farmers, students, tourism industry representatives and members of the local community).

98% of interviewees could identify the Black Parrot and an impressive 97% knew that the species is endemic to Praslin. Only 42% were aware of the threats to the bird. The majority did not think that the black parrot caused any problems and 77% understood that the parrots contribute to the local economy. A small minority reported that they chase parrots away, and these were mostly farmers who were concerned about damage to their fruit crops. Most Praslinois, however, are in favour and willing to help in the protection of the black parrot.

School students knew most about the black parrot, presumably due to the extensive SIF education and awareness programme. This has helped us to identify gaps in our outreach work and highlights that more effort needs to be made with educating sectors of society to assist in the protection of the Black Parrot.

Ultimately, this research programme has been highly successful in broadening the knowledge of several aspects of black parrot biology and ecology which will help to guide conservation management of this endemic species.



RING-NECKED PARAKEET ERADICATION: WHY, HOW AND WHERE ARE WE NOW?

Laurent Leite, Nyara Annacoura, Jesse Friedlander & Chris Tagg

Under European Union funding a programme to eradicate the Ring-necked Parakeet (*Psittacula krameri*) or 'Kato Ver' from Mahé was started in 2013. Ring-necked Parakeets were introduced to Mahé in the late 20th century as caged pets and escaped in 1996, quickly establishing a viable population. The Ring-necked Parakeet is an agricultural pest and poses a potential major threat to the endemic Seychelles Black Parrot should it establish on Praslin through competition for nesting sites and food, and potential disease transference.

Several initial catching methods were trialled and shooting by professional hunters was confirmed as the most effective, safe and humane targeting technique. A total of more than 480 parakeets have been culled since July 2013. The remaining population is now estimated at less than 50 birds.

Alongside the intensive eradication activities, an education and publicity programme has been implemented across Mahé and Praslin. The public's involvement and support in providing information on the birds' locations has been integral to the success of the project. Radio interviews, adverts and school presentations were all used as well as the distribution of posters and leaflets appealing for information.

Some of the main challenges to the project have been from poor weather conditions, the high intelligence and rapid education of the birds, and their cryptic appearance when in trees. The eradication programme, however, has made good progress and is now close to entering its final phases. If successful, the project will eliminate this threat to the Black Parrot and provide important lessons for other avian eradications.



A critical part of the RNP project has been education and awareness activities



THREATS TO THE VALLÉE DE MAI BIODIVERSITY: INVASIVE SPECIES

Lucía Piñeiro, Dainise Quatre & Shanone Adeline

Invasive plants threaten the native biodiversity of the Vallée de Mai and in 2012 an EU funded project started which aimed to tackle several invasive species activities at this site.

The work started with a plant survey to determine the abundance and distribution of introduced and native trees and help identify priority species for control. After this, removal experiments were conducted to investigate the consequences of removing trees and the resulting changes in light levels. Sudden reductions in canopy cover were shown to benefit the growth of introduced species, but this can be managed through the use of native palm leaf litter. Various control methods, including ring-barking, drilling, and herbicide application were also trialled to assess the most effective method for controlling each of the invasive tree species.



Ring-barking an introduced tree sapling in the Vallée de Mai

All adult trees of the first six target introduced species in the Vallée de Mai were controlled within a six month period. Another five species were controlled after this with a total of 2335 trees treated in under a year by the small team. The removal of invasive saplings of these species and the water-loving vya tang is still ongoing and some trees require controlled felling. Controlled trees are checked regularly and defensive responses such as bark re-growth or explosive flowering or fruiting are noted and addressed if needed.

The project has also examined the presence of certain animal invasive species. A survey of the Indian Mynah Bird (*Acridotheres tristis*) was conducted by SIF in 2010 and again in 2014. The bird was absent from the Vallée de Mai and Praslin National Park in the 2010 survey but in 2014 it was recorded at several points within the national park. There is therefore concern that their distribution is increasing, which could impact on endemic species in the Vallée de Mai.

Invasive Yellow Crazy Ants (*Anoplolepis gracilipes*) were recorded for the first time in the Vallée de Mai in 2009. Since then five surveys have been conducted to monitor their abundance and distribution. The abundance of the ants has fluctuated over the years but in general is not increasing. There have been small movements and spread in distribution but the ants remain in the north and east areas of the Vallée de Mai towards the firebreak. Further monitoring and research into containment and control methods are needed.

Although the EU funded project has ended the work on invasive species in the Vallée de Mai will continue and be mainstreamed into the activities at the site. Great progress has been made into protecting the native biodiversity of the Vallée de Mai but there is still much more to be done.



THREATS TO THE VALLÉE DE MAI BIODIVERSITY: FIRE RISK AND MANAGEMENT

Vicky Barbé

One of the major threats that the Vallée de Mai faces is forest fires. Research was undertaken into this threat by Vicky Barbé as part of her BSc dissertation in Environmental Sciences at the University of Seychelles.

The aim of the project was to understand the causes of forest fires, and collection of data was undertaken both through a literature review and via interviews. A total of 85 forest fires were recorded on Praslin from 1958 to 2013, some of which caused severe damage to areas of native palm forest. To determine the causes of these fires, archive documents were examined and interviews conducted with Praslinois.

The majority of fires were ascertained to be caused by anthropogenic factors. The highest number of fires was recorded in the dry south-east monsoon in August, and 2004 saw the highest annual number of fires to date. To help prevent future fires, possible methods for education and awareness activities were explored with one of the most important discoveries being the need to thoroughly plan these activities first.

The existing fire protection measures in the Vallée de Mai were highlighted and several recommendations made for a contingency plan, especially with regards to education and awareness activities. Another recommendation was that the Lighting of Fire Act requires revision. As a follow-up to this research SIF is presently working with the Department of Environment to achieve this.



Fire poses a serious threat to the Vallée de Mai



THREATS TO THE VALLÉE DE MAI: COCO DE MER POACHING

Marc Jean-Baptiste

An increased number of Coco de Mer (*Lodoicea maldivica*) nut poaching events threaten the natural recruitment and future regeneration of this endemic palm species. Largely due to this threat the Coco de Mer was upgraded from Vulnerable to Endangered status on the IUCN Red List in 2011.

A total of 16766 Coco de Mer trees of all ages have been recorded in several populations; 7065 (28.8%) in Vallée de Mai, 5908 (24.1%) in Fond Ferdinand, 3904 (15.9%) in Praslin National Park, 3793 (15.4%) on Curieuse, and 3706 (15.1%) on private land (Fleischer-Dogley et al., 2010). The number of nuts poached from the Vallée de Mai and Fond Peper has fluctuated since 2014, with a total of 228 nuts poached in 2014. The immature nuts are poached for their jelly which is eaten as a delicacy and mature nuts are sold as souvenirs or for the kernel inside which is exported for use in Chinese medicine.



The destruction left from a Coco de Mer poaching incident

As part of an education and awareness programme by SIF on the threat of poaching to Coco de Mer, various activities have been organised to coincide with national or international environmental theme days. These events have attracted media coverage which has helped to raise awareness of the campaign.

Actions being taken to address Coco de Mer poaching include revising the existing law and policy on Coco de Mer, which is being drafted for the ministerial cabinet's approval, creating a Coco de Mer 'task force' to work together to curb poaching activities with representatives from the Department of Environment, Seychelles National Parks Authority, Fond Ferdinand, SIF and private landowners, and the creation of a

dedicated fast-track tribunal court for environment and transport offences which will hopefully lead to a more effective judicial system.



TOURISM IN THE VALLÉE DE MAI

Medina Laboudallon & Evadney Lafortune

The Vallée de Mai has undergone some significant transformations over the past thirty years as SIF have strived to provide a better experience for its visitors. The original visitor centre was rebuilt in 2009 with a new improved centre that could provide a world class service and meet the needs of a growing number of visitors. Also in 2009 a visitor survey was conducted which highlighted the need for an improved range of services. In light of this survey permanent visitor attendants were employed who offer assistance to the visitors and conduct guided tours of the forest. The visitor management team also assist in hosting additional activities at the visitor centre to commemorate specific international days such as World Tourism Day. In 2014 new information materials were implemented in the Vallée de Mai with a new visitor leaflet and information boards in the forest.

The Vallée de Mai has hosted an increasing number of visitors since 2009 with 86,985 people visiting in 2013. As well as contributing to the successful operation of both Seychelles' UNESCO World Heritage Sites, the Vallée de Mai and Aldabra Atoll, these visitors provide socio-economic benefits to Praslin and Seychelles. Taxi drivers, travel agents, local artisans, and private guides all benefit directly from their visit to the Vallée de Mai, but hotels/ guesthouses, retail outlets, food producers, and public transport providers also benefit indirectly. SIF sources local products where possible and invests in the local community, only recently they donated two bus shelters to Praslin.



The visitor centre at the Vallée de Mai

SIF will continue to work towards ensuring that the Vallée de Mai remains as a model for sustainable tourism, and as a place where tourism, education, conservation and research can all be conducted side by side.