

Kapisen

Plant Conservation Action group



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Newsletter



Communicating about plants and plant conservation

Communication about plants

There seem to be many iconic animals but relatively few iconic plants. For example, in Seychelles one could mention Coco de Mer and Pitcher plant, but many other plants get overlooked. Is it because most people like the showy (alien!) flowers and shrubs in their gardens but see other plants as merely green trees, boring grasses, or weeds? If so, how can we get more people excited about native plants and their conservation?

Communication that is creative can arouse interest, even passion, for the exciting aspects of plants and their conservation. Individuals may be encouraged to take plants more personally, and communities to actively support plant conservation. Is this what the local TV programme ‘Santye Nou Zil’ manages to achieve (p. 3)? And it is not just locals who need to be enthused. As a tourism destination, Seychelles needs well-informed nature tour guides who are exceptional communicators (p. 7) so that visitors take away a sense of the importance of conservation.

The same is true for attractions such as gardens and museums. How do you promote complex concepts to visitors in an interesting and enjoyable way (p. 4)? Outreach is fun, motivating and rewarding. Yet the articles on p. 4 and p. 16 show how this may be easier for some topics and audiences than for others. Biosecurity, for example (p. 16) has become increasingly important but how best to communicate the issues at stake so that individuals understand that they may need to change their behaviour?

Schools in Seychelles are trying to do just that through the Eco-School programme (p. 6), which aims to encourage conservation and sustainable practices through activities with real goals. At a university level, the now established environmental science degree course (p. 11) is training a new generation of Seychelles environmental workers. This article also gives an example of one student’s plant conservation research project (p. 12).

Once basic knowledge and especially excitement are present, even scientific literature about plants and their conservation can become fascinating. How do you find the article about the Pitcher plant on p. 13 for example? Isn’t it exciting that by looking at the genes of a plant in the laboratory, scientists can guess what happened to this Seychelles plant in the past? And some of the information in scientific papers may be of interest to a wider audience - so how best to get across the main research findings? For example, most people find taxonomy dull and

difficult - but try reading the article (p. 10) about a recent mountain plant discovery. Reading the story behind an unexpected discovery might give you a feeling for the kind of riddles scientists must solve before a plant gets a name. Does the different approach make taxonomy more appealing as a topic?

In Kapisen we try to balance the scientific articles with articles of a more ‘popular’ kind. Do you think we succeed? Perhaps you will write and tell us...

Also in this issue is our regular update, PCA News (p. 17), plus particularly interesting Notes from the Field (p. 19), along with the New Literature section (p. 24). We have a young artist, Zoë Chong-Seng, to illustrate the communications theme of this Kapisen issue (p. 15 & 22) and of course a fun activity page (p. 9).

Editorial Team: Katy Beaver, Eva Schumacher and Christoph Kueffer

Cover photo: ‘What plant is in THIS bag?’ - a game to encourage people to take more interest in plants they use every day. (National Expo 2015, PCA)

All photos not credited are contributed by PCA

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Content

Plants are TV stars	3
Spicing up plant education	4
Eco-Schools	6
Nature trail adventures	7
Activity Page	9
Lost species	10
Education meets conservation	11
Lalyann Potao (Nepenthes)	13
Biosecurity	16
PCA News	17
Notes from the Feld	19
About PCA	23
New Literature	24

Plants are TV stars

Pat Matyot

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I am on top of Mont Pot à Eau on Silhouette. Mist billows past, occasionally thinning to let through a vague glimpse of the village of La Passe 600 metres below, but mostly too thick today for us to see beyond the nearby Mangliye granbwa (*Glionnetia sericea*) with deep pink blossoms. My SBC colleagues make final adjustments to the camera resting on its tripod amid the *Dicranopteris* fern. A directional microphone attached to a boom arm is positioned close enough to pick up my voice but far enough to be outside the camera frame. The sound operator has fitted it with a wind shield. I am vaguely aware that someone somewhere will think I am imitating British television's David Attenborough in the *The Private Life of Plants*, or - from a previous era - David Bellamy of *Botanic Man* fame. But hey, there is such a thing as "best practice" that we are supposed to emulate!

The director, Jérôme Dogley, clicks his fingers and I begin: "We've made it to the top of Mont Pot à Eau! And while the view over La Passe may not be perfect because of all this mist, this is a good place to look more closely at the carnivorous Pitcher plant. Here is a particularly big pitcher over here - let's peer inside to see what insects it has caught and is now digesting..." I pause and we get ready for a close-up view of the Lalyann potao (*Nepenthes pervillei*). I remember reading about "the classic Bellamy image of him staring out of the foliage, eyes bulging, cheeks bursting with childlike enthusiasm" and Attenborough's "raspy yet authoritative clipped tone". I certainly don't want to mimic any of that, but I definitely hope I come across as both enthusiastic and authoritative.

A few days after the Silhouette episode of *Santye Nou Zil* is aired on SBC TV, a man stops me outside the post office in Victoria. He tells me he works for the Public Utilities Corporation (PUC), he "loves nature", he enjoys watching nature programmes on TV, he particularly enjoys watching *Santye Nou Zil*, and do I take other people along with me on these hikes when shooting the programme because, if so, he would love to come along on some of them. I realize that I have lost count of the number of people who have told me they find the series "interesting", "entertaining", "eye-opening", "stimulating" or even "fascinating" and want to be there when we are



A new season of *Santye Nou Zil* ("Our Island Trails" in Creole) is due to begin in August 2015 (SBC).

filming. Perhaps I should suggest to Jérôme and to SBC management that we should start a *Santye Nou Zil* Club!

One could easily be led to think that it is the animals - the graceful slithering snakes, pop-eyed chameleons, robot-like stick insects, the birds in all their multifarious diversity and the like - that get viewers hooked. There is no doubt that they contribute to the success of *Santye Nou Zil*, but from the comments we receive, in face to face encounters as well as in the social media, many people find the plants just as intriguing. I remember one elderly lady telling me how she was amazed to discover in one of the programmes that the rosette arrangement of leaves of the various species of Vakwa (*Pandanus* spp.) is designed to collect rainwater. A Polytechnic student commented that it was "so easy to follow" our explanation of how the Lalyann san fen (*Cassytha filiformis*) leads a parasitic existence by using its suckers to cling to other plants. Then there is the security guard at Oceangate House who had never realized the Bird's nest fern (*Asplenium nidus*) does its own composting...

The conclusion I draw from all this is that it is not enough to just tell people that we have all these endemic plants that are rare and need to be protected. Viewers who watch *Santye Nou Zil* obviously develop a special appreciation - and dare I say respect - for plants when they learn something of their biology, when plants are depicted not just as passive museum exhibits (albeit in a living museum), but as living entities with a functional metabolism and with all manner of strategies and adaptations for growth, feeding and reproduction. In a way it is as if plants have gained the respect of viewers because *Santye Nou Zil* has "elevated" (rehabilitated?) them to a rank equivalent to that of animals in terms of interesting "behaviour".

Is this a form of "infotainment" (information combined with entertainment) - and why not, especially if it results in consciousness-raising among viewers?



Pat Matyot highlights in *Santye Nou Zil* the amazing adaptations of plants and animals (SBC).

Or does the success of the programme reveal an inherent “scientific” attitude of people to plants (interest in the physical attributes and biological functioning of plants) in addition to other possible attitudes: utilitarian (importance given to the practical and material value of plants), dominionistic (interest in the mastery and control of plants), aesthetic (value given to the symbolism and beauty of plants), ecologicistic (concern for the interrelationships between wildlife species and natural habitats), etc.? (These terms were originally used by American ecologist Stephen Kellert in connection with people’s attitudes to animals.) There is room here for an in-depth study.

Spicing up plant education

Katy Beaver

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Le Jardin du Roi is a lush garden of spices, tropical fruits, intriguing fragrances and medicinal plants, much visited by tourists and locals alike. It is one of the few places where visitors can learn about the history of Seychelles in relation to plants, as well as getting to see, smell and sample produce from the garden.

Seychelles had no indigenous human population in the past. It was claimed by the French and settled in 1770, when the intention of France was to grow spices on the islands in order to break the Dutch

Of course, there are also the technical proficiency of the SBC camera operators I work with, and the directing and editing skills of director Jérôme Dogley. At this point I am reminded of something that David Attenborough once said: “Actually, making natural history programmes is not all that difficult. Making superlative ones is pretty difficult, but making OK, viewable, enjoyable programmes is not all that difficult because the animals are so interesting. You’ve only got to get close-ups and you’re away! So a lot of people could make television programmes...” We just need to add “and plants” after “animals” in that quote. Those close-ups of rainwater being channelled down Pandanus trunks, Lalyann san fen haustoria or suckers affixed to Prindefrans (*Chrysobalanus icaco*) stems, and insects trapped inside Lalyann potao pitchers certainly seem to have contributed to making whole chunks of *Santye Nou Zil* memorable!

Research in other parts of the world has shown that environment-related stories in television news and nature documentaries contribute to environmental sensitivity and pro-environmental behaviour. The response to the SBC’s *Santye Nou Zil* suggests that this is the case in Seychelles as well. Something we should bear in mind and make use of as it becomes clearer that plants are part of our bio-cultural heritage, and “an indicator or benchmark of how communities manage their environments”.



Visitors viewing one of the information boards.

monopoly of the lucrative Far Eastern spice trade. To this end a garden was prepared at Anse Royale on Mahé Island and planted with seedlings of nutmeg, clove, cinnamon and pepper. Unfortunately this ‘King’s Garden’ of spice plants was destroyed



View of part of the new environment museum.



Spices and spice stories (left).
Seychelles medicinal plant poster (right).

in error during confusing circumstances. Plans changed and instead the settlers cleared much of the forest, utilising the excellent timber and planting agricultural crops, including cotton, sugarcane and coconut. Agriculture thus became the mainstay of the economy for two centuries, only losing its dominance when tourism expanded in the 1970s.

At that time, Le Jardin du Roi property had been for many years a typical homestead producing copra, spices such as cinnamon and cloves, sugarcane, fruits, vegetables and root crops. It did not get called Le Jardin du Roi until it was developed into a tourism attraction in the 1990s, when the owners decided to name their spice and fruit garden after the 'King's Garden' as it is located close to the site of the original spice garden at Anse Royale. Initially the owners set up a small restaurant, provided a small map and a list of names of the garden's main plants, and established a nature trail on the property to give overseas visitors a 'taste' of tropical forest.

In 2013, when PCA first linked up with Jardin du Roi, the potential for expanding plant education within both the garden and the forest was obvious. The variety of plants present in the garden, including many that were introduced during the past 15 years, was

exciting, as many were unusual in Seychelles. Many hours were spent by PCA members researching and verifying names, origins, uses, interesting facts and history. Eventually new numbered labels were produced and a long list of plants to serve as a guide for visitors. At the same time, this valuable research went into the production of colourful information boards about the main spices such as pepper and nutmeg, aromatic plants including patchouli, historically important commercial plants like cotton, and the mature male and female Coco de Mer palms. Extra information leaflets were created to appeal to visitors with a special interest in palms, medicinal plants or ornamentals, for example.

Another major part of the educational work for PCA was the creation of a small environmental museum, much of which was prepared by a Master student from ETH, a university in Zurich, Switzerland (Kapisen 17, p. 21) with additional input from PCA members and volunteers. The aim was to educate through interactive exhibits as well as through colourful posters and providing samples of spices, Seychelles rock specimens and interesting plant objects. Having fun with games and displays that have moveable pieces, open and close, turn around or lift is good for all ages.

Still to complete are four information boards to explain why and how the nature trail forest at Jardin du Roi is being rehabilitated (see p. 21), e.g. which native plants are used, wildlife that can be found now and will be attracted once greater plant diversity is present, and how this will benefit the surrounding environment.

Hopefully visitors of all ages will come away from Le Jardin du Roi with a greater understanding of plants in their lives and how important they are in both the Seychelles environment and in its rich history.



Plant-animal matching game.

Plant education in Seychelles' Eco-Schools

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The Seychelles' Eco-Schools programme has existed for the past 20 years and aims to promote sustainability through environmental education in the daily operation of schools. Schools are asked to find ways to respond to local and global sustainable development (SD) challenges, such as climate change and unsustainable management of resources, e.g. water, energy and plants.

The Eco-Schools programme concerns more than just teachers and students. It also aims to involve other members of the local community and environmental organisations. Such collaboration promotes environmental learning and environmental management practices within both the school and the wider community. Organizations which support the Eco-Schools programme in schools are the Ministry of Environment, Energy and Climate Change (MEEC), and the NGOs Sustainability for Seychelles, Wildlife Clubs of Seychelles, Plant Conservation Action group (PCA), Seychelles Island Foundation, Save our Seas Foundation, amongst others. For instance, MEEC provides financial support for educational trips, activities, projects, national competitions and the annual Eco-School award ceremony. PCA produces educational resources on plant species and conservation and conducts workshops and field trips.



An area planted with a variety of plants at Plaisance Primary School (Ministry of Education).



Children learning about Vallée de Mai World Heritage Site on Praslin (Ministry of Education).

All 34 public schools are registered for the Seychelles Eco-Schools programme. Schools embark on Education for Sustainable Development (ESD) practices in order to become sustainable institutions, support national sustainability policies, and educate the younger generation and adults on sustainable living. ESD practices undertaken in schools are related both to teaching and learning, and good management of the school's resources and physical environment. Several Eco-Schools have implemented successful projects such as composting of organic waste, creating heritage gardens of fruit trees and medicinal plants, outdoor seating areas for students, re-use and recycling of solid waste materials to be used in the school, and harvesting rainwater for cleaning and gardening.

Some of the activities are directly related to plants and their conservation. The Seychelles curriculum includes the flora of Seychelles and their conservation. Examples of topics are classification of plant species, plant parts and their functions, plant life cycles and growth requirements, plants characteristic of Seychelles terrestrial habitats (including endemic, indigenous and endangered species, as well as those that are invasive), and conservation issues such as over-consumption, poaching, or biodiversity loss, to name a few. Students learn not only about the traditional and economic uses of plants, but also about their value to us and to the environment.

Schools are making a special effort to establish a closer link with real life situations concerning plants, in order for the students to develop a better understanding of the environment around them. Environmental learning about plants takes place inside the classroom and also on field visits - to the herbarium, a nature reserve, botanical gardens, a coastal habitat, and also to the school's garden consisting of a mix of ornamental, medicinal and edible plants. A variety of methods is used to guide

the learning interactions. These include role plays, talks, presentations, games, quizzes, demonstrations and experiments, and interpretative trails, amongst others. Various learning support materials have been developed locally, as well as overseas. Students also learn through educational activities organized to commemorate environmental theme days, such as World Biodiversity Day, Environment Day, Protected Area Day and Wetlands Day, most of which are included in the Calendar of Activities produced annually by the Ministry of Education.

Over the years, most Eco-Schools have made an effort to embark on special projects promoting plant education. The projects have so far focused on:

- Establishment of a medicinal garden on school grounds,
- Planting of school grounds with ornamental plants and shade trees,
- Planting of fruit trees which promote healthy eating and also provide shade,
- Establishment of vegetable gardens to raise awareness on locally produced food, gardening techniques, healthy eating and to raise funds for the school,
- Rehabilitation of coastal habitats near the school,
- Tree planting in specific areas within the community.

The projects have resulted from the collective efforts of students and adults.

Much could be said about the benefits of plant education in schools. Students develop awareness about the endemic plants of Seychelles and also those which are invasive. They learn how human activities affect plants in Seychelles and of the associated risks to our society. Depending on the topics and methods used, students begin to understand the interdependence between plants and animals. They also learn the benefits of having plants in the surrounding environment, and acquire knowledge and skills on sustainable gardening, which in turn encourages healthy eating and consumption of locally grown food. Plant education thus enhances the preservation of the natural and cultural heritage of Seychelles, which is of major importance for the people of Seychelles and its economy. In spite of the attention given to plant education in schools, there is still more to be done. With the rapid changes taking place globally and SD challenges affecting Seychelles, there is a potential to revisit the existing curriculum and include topics which have become increasingly significant, such as biosecurity. In addition, more capacity building sessions could be organized for teachers in Eco-Schools to equip them with the necessary knowledge and skills to facilitate learning about plants.

To learn more about the Seychelles Eco-Schools programme visit us at www.ecoschoolseychelles.org

Communication through nature trail adventures

Lindsay Chong-Seng
PCA member

Visitors to the Seychelles often receive plentiful information about the attractions of 'sun and sea', but much less about the fascinating adventures they can have away from the beaches and up in the hills. As a result, many of the visitors who choose to walk in the mountains or explore the smaller islands are those who already have an interest in nature. And they are keen to discover more about the Seychelles environment and wildlife. Taking visitors and local people into our island environment has been a small but enjoyable part of my life and work for many years.

However, it is strange for a local naturalist to find that even these nature-loving visitors tend to think



Lindsay guiding visitors on a nature trail.

that the lush green vegetation of the mountains is pristine (i.e. untouched native forest) - which in many cases could not be further from the truth, since alien species now make up 70-90% of most hill forests! Likewise, many of the visitors taken along nature trails or exploring in the hills have travelled widely, so they tend to focus on familiar plants and animals, or

notice conspicuous species which stand out in some way. For example, Albizia with its conspicuous flat topped canopy stands out amongst forest trees (and is alien of course!); and male Madagascar fodies with their bright red plumage during the breeding season make an impression – and they are also introduced!

Nevertheless, people come on guided walks to learn, and although Cinnamon is also an alien species, it is a good starting point, because it is common in the forest and there is much to talk about. It was introduced early in the history of settlement (1770s) as part of the (failed) attempt to establish Seychelles as a spice producer - and then was spread by native birds into a deforested environment (because settlers extracted timber from the primary forest). So, depending on the interests of the group, it is easy to engage people in conversations about history, subsequent changes to the forests, land use, current exploitation of cinnamon and cultural information about its collection, preparation and use as a spice, as well as its effects on other forest species.

It is also easy when following trails to pick out different habitat types (e.g. palm forest, mist forest, boulder fields), locate interesting species of plants and animals, and talk about their adaptations and usually their uniqueness, as many of the notable species are endemic. This then allows an introduction to the fascinating geological history of the granitic islands and to their extremely ancient origin as part of the Gondwana super-continent. It also enables a discussion of the evidence for links (now being confirmed genetically) between Seychelles species and those in e.g. East Africa, Madagascar and Indo-Malaysia, the latter of which has a surprising amount of influence, considering the great distance between the two locations.

One of the best ways I have found to keep an audience's attention, whether on a nature trail or

during a cruise ship lecture, is to tell stories, of which there are a great many - if you choose to learn them! Here is just one example:

Kapisen (the tree whose local name we use for this newsletter) has a large seed resembling the head of a Capuchin monk (Kapisen in Kreol), so it is useful to find a seed near the tree (or have one in a pocket in the event you cannot find one!). This little story of the tree name's origin can lead to information about the way the seed is dispersed by fruit bats; and then to how a researcher found that the thick leaf stalks are favourite homes for tiny bark-boring beetles; which then leads on to the rough bark of the tree and how the very durable timber was used historically, at the same time describing the different styles of houses built in the past by the rich and poor in Seychelles. Also the reddish brown colour of the undersides of the leaves brings in a story of how one ex-minister flew over a particular mountain in a helicopter, saw the covering of Kapisen and immediately said 'Let's exploit the timber' – which proved to be a gentle wake-up call for plant conservationists and foresters (although it would not have been economically viable)! Even the scientific name of Kapisen (*Northea*) has a story, as the Victorian artist Marianne North collected the first flowers for Kew and the unique genus was named after her.

Stories will depend on the audience and their particular interests, and being sensitive to your audience is one of the skills required of a good nature guide. For example, if people are interested in medicinal plants, there are many stories about both the common and rare plants used for medicine in Seychelles.

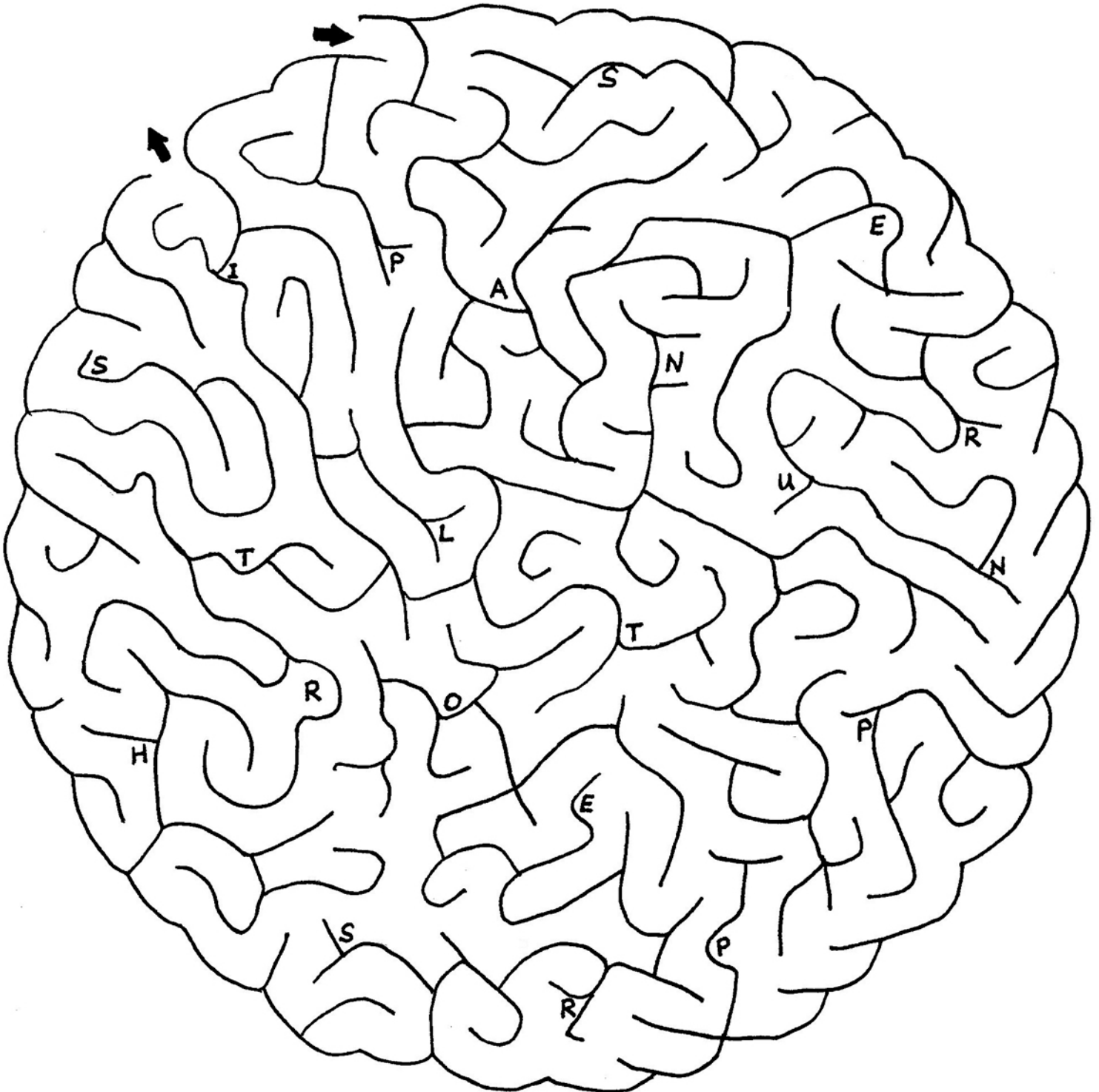
Creating a sense of wonder at the magnificence of nature and the diversity of life on Earth is also important and simple examples can bring this about. For example, Seychelles has one of the tiniest frogs in the world. It lays eggs and cares for them until they hatch into miniscule froglets only 2mm long and yet with a complete skeleton, beating heart and blood vessels... and not much larger than the largest single-celled protozoan. Another example which can lead to discussion and wonder is the tiny cyanophyta (photosynthesising bacteria formerly called blue-green algae) which cover many of the vast granite expanses of rock known as 'glacis' in Seychelles. These are some of the most ancient of all living organisms and yet they are capable of chemically breaking down one of the hardest rocks that exists, slowly eating away at the surface...



Kapisen on a mountain top (cinnamon at bottom left).

Brainy Plant Maze

As you find your way around this maze, write down the alphabet letters you meet on your path. When you follow the correct path, the letters will make a word.



This word is something that plant conservation needs. Maybe you can help by giving it some!
Answer on page 12.

On the quest for a lost species

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Dawn slowly crept in as we tossed from side to side in our tiny tent on top of Pérard in the Morne Seychellois National Park. The night before had been calm, with the *Sooglossus* frogs croaking melodious tunes and the gentle wind breezing through the *Pandanus* and stunted *Kapisen* trees. The Sunbirds started their morning chorus indicating that it was time to wake up. After a quick breakfast - woodland style - Bruno, as expedition leader, took us up and down the mountain through breathtaking forest landscapes as we continued our exploration for interesting habitats and rare threatened organisms or new species. The work was part of the Key Biodiversity Areas Project that will contribute to biodiversity conservation in the Seychelles' granitic islands. Suddenly, at the forest edge, we walked onto an extensive breathtaking inselberg covered solely by native species. On the horizon was the island of Conception and to the North lay the proud and majestic Silhouette Island. Whilst Dr Elvina Henriette a Conservation Biologist was admiring the beauty before her eyes and chasing after some strange crickets, Dr Bruno Senterre the Botanist was on his knees checking out a plant. 'Anything interesting?' asked Elvina. 'We may have something new. A grass, but I do not know which species.' Bruno answered and went off to collect some specimens. That day, in November 2012 was the beginning of a story that took us on an interesting journey of discovery.

A few days later, the team was back at the National Herbarium on a quest to find out the identity of the unknown specimen. It belongs to the difficult family of sedges (Cyperaceae), in which the most important characters are hidden within the minute spikelets and require dissection for identification. More hopefully, the genus could be identified as *Costularia*. At that point we thought that we might have a species new to science, because only one species of *Costularia* was currently recorded in Seychelles (*C. hornei*, but very different from our unknown plant), and almost all other species known in the world (only about 30) were island endemics (from Madagascar, Mascarenes, Borneo and New Caledonia). Our unknown plant seemed to be different from all these known species, but one more piece of the puzzle was needed to ascertain that our plant was indeed new to science. That piece was a specimen collected in



Cladium xipholepis (B Senterre).

the 19th century, and stored at Kew (England), and which a botanist by the name of Baker originally described as a species, endemic to Seychelles, different from *Costularia hornei*. Other botanists after him decided Baker was wrong and his sedge became forgotten. But something was suspicious, and we had to triple check that. The search began, but to our disappointment the Kew specimen could not be found. The vital piece of evidence seemed to have got lost.

A few months later, Elvina received a call from Bruno, who had asked a friend to double check for the specimen at Kew. 'The lost specimen has finally been found. Have a look and tell me what you think'. 'Hang on, this looks exactly like our species!' Elvina exclaimed. Then Elvina was cast into doubt because the description given in the flora by Baker did not match the very specimen he described! Baker named the species as *Cladium xipholepis*, but his specimen did not have any characters corresponding to his own definition of the genus *Cladium*! 'How, could Baker have been wrong in the description of the specimen?' Elvina thought to herself. 'And all the others that came after him did not pick up on the mistake and instead confused it with several other taxa? How come?'

Then Elvina remembered something wise that Bruno told her. 'You should always go back to the source, verify the evidence, and never trust hearsay'. And he was right. Whilst Baker had named his species *Cladium xipholepis*, the other authors had considered it as a young state of another species, i.e. *Costularia hornei*, based on the immature state of the specimen which was the only one known for this plant. Such considerations and the absence of other more mature specimens fuelled the trail of confusion over several years. This shows the importance of collecting several specimens at different stages of flowering

and fruiting so that important characters can be observed. Our rediscovery of Baker's true *Cladium xipholepis* allowed us to collect new specimens with more developed inflorescences and to correct important errors made in the original description of the plant.

Although we had not discovered a new species, we were delighted at the fact that we rediscovered an endemic species that had been 'lost' from the Seychelles flora. Had we not gone on a quest to solve the mystery of this unknown species collected on that fateful morning on the mountain of Pérard in the Morne Seychellois National Park, we might have forever lost a species. Such discoveries indicate that more studies of Seychelles fauna and flora are still needed, and especially a review of the monocotyledons. Our study was part of a 2014 project funded by GEF for the training of a Seychellois

in taxonomy. Our findings have now been submitted for publication, which will result in the first taxonomic paper published by a Seychellois as first author (Henriette et al., submitted). Unfortunately, there is currently no funding to continue our taxonomic studies on the other potentially new species, and to maintain the research team built in the last few years at the National Herbarium.

Reference

Henriette, E., Larridon, I., Morel, C., Goetghebeur, P., Bruhl, J.J. & Senterre, B. (2015) Revision of the genus *Costularia* (Cyperaceae: Schoeneae) for the flora of Seychelles, including the re-discovery and resurrection of a rare endemic species. *Phytotaxa*: submitted.

Education meets Nature Conservation in Seychelles

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In recent years, environmental management has gained a central place among the most pressing educational issues that our nation faces. Graduating students are seeking skills that allow them to contribute to solutions to 21st century challenges, including those concerning environmental sustainability. In providing the scientific foundations to meet these challenges, the University of Seychelles (UniSey) together with environment- and conservation-related organisations play a crucial role. This article provides an example of how university education in environmental science meets the needs of society and those organisations that dedicate themselves to sustainability and nature conservation.

The UniSey *BSc Environmental Science (Honours): with Specialisation* is the first environmental science degree to be developed in Seychelles. The degree has been developed to fit within priority development areas locally, regionally and globally. Local programmes allow students to gain qualifications relevant to Seychelles and the broader regional context of Small Island Developing States. There has been much support throughout the development from local and international partners, as well as a team of devoted lecturers from all over the world. The recent graduation of its first cohort of students in March

2015 has seen students employed in environment related fields of practice within Government and Non-government organisations. Two students are now also enrolled in Masters Programmes at international universities.

The strong working relationships between UniSey and local and international organisations also enable students to enjoy programme highlights including:

- Programme specific *Work-Based Experience* where students gain experience in applying their knowledge in the field in actual work-related situation.
- Selecting from a range of specialisations in their third year enables students to take a targeted approach to learning in line with their expectations and future career choices.
- Interacting with community conservation groups through the *University Centre for Environmental Education (UCEE)* further facilitates networking with partners/industry and reaches out to teachers/students across Seychelles.
- A Master's Degree programme for working professionals to advance their learning through collaboration with overseas Universities.
- The opportunity for students to engage with a range of professional research projects undertaken by the University of Seychelles.

The following abstract demonstrates how research completed by students incorporates the above mentioned course concepts and to what extent UniSey students are able to achieve these goals.

Research Project and B.Sc. Dissertation:

Leaf Growth Rate of Lodoicea maldivica

by Annabelle Constance

Abstract

Along with *Raphia regalis*, the iconic Coco de Mer (*Lodoicea maldivica*) has the longest leaves in the plant kingdom. As part of my undergraduate thesis at the University of Seychelles, I was interested to learn how Coco de Mer can grow such long leaves. To address this question, I first identified leaf growth rates of Coco de Mer and tried to determine whether growth rates changed with: (1) the stage of plant development and (2) with seasonal rainfall. In the interest of evaluating longer-term response of the species to changing climatic conditions, a third hypothesis tested for annual changes in leaf growth.

More than five years of raw data collected by Seychelles Islands Foundation (SIF) on natural stands of Coco de Mer was used. Seventy-five trees at different development stages (seedling, juvenile, immature, adults) were measured for growth in their youngest leaves. This process involves identifying the “bayonet”, the central and newest growing leaf of the palm, marking it at a standardised 40 cm from the base, and subsequently recording the growth in distance from the base to the 40 cm mark, every three months.

Coco de Mer had greater growth rates when approaching reproductive heights, which subsequently decreased as the palm reached reproductive maturity. Results were discussed in terms of investment priorities of the palm at different stages of development. Seedlings partially depend on food reserves in the seed but as the palm grows and “detaches” from seed, survival relies on response to resources. Since light is commonly the limiting factor in rainforests, it appears that immatures/juveniles invest heavily in rapid leaf growth to exploit light. The higher resource requirement of reproduction might be responsible for the slowing down of leaf growth at the adult stage.

Coco de Mer appears to respond to seasonal changes in rainfall availability as leaf growth rates were consistently and significantly higher during the wet season. Despite annual climatic extremes experienced during the study period, annual leaf growth rates did not differ significantly. The fact that the patterns of inter-year leaf growth of Coco de Mer is relatively constant, demonstrates the inherent resilience of the palm to climatic variability. However, along with projections of longer dry seasons and more intense precipitation events in the Seychelles, seasonal availability of resources (e.g. precipitation dependent nutrient uptake) is expected to change. It is in view of such climate changes of great importance, that the pattern of growth in this iconic species is continuously monitored.



Rain or shine, UniSeey Environmental Science students carrying out field work (photo credit: left: PCA, right: UniSeey).



Answers to ‘Brainy plant maze’ (see page 9): SUPPORT

Unravelling the population structure and demography of the Seychelles pitcher plant (*Nepenthes pervillei*)

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The Seychelles pitcher plant (*Nepenthes pervillei*) is the sole representative of the pitcher plant family (Nepenthaceae) in the Seychelles, where it is endemic and occurs on two islands: Mahé and Silhouette. It exhibits the family's characteristic pitcher-shaped organs that are used to capture and digest arthropod prey, which represent its predominant source of mineral nutrition (particularly nitrogen and phosphorus) (see **Figure 1**). This adaptation allows the Seychelles pitcher plant to grow in very shallow and nutrient-poor soils.

The distribution of this species is remarkable in two ways. As a Seychelles endemic, it occurs exclusively on an island archipelago situated approximately a thousand kilometres away from both the nearest landmass (Madagascar) and its nearest *Nepenthes* neighbour (the Madagascar pitcher plants), in the midst of the Indian Ocean. As a so called inselberg species, this plant is distributed predominantly along the summits and ridges of the islands' inselbergs (or glacis), 'terrestrial islands' that project vertically from the forested landscape of the lower elevations, where updrafts of air rising up the mountain facilitate to carry its insect prey. This twofold insular distribution makes this species a particularly interesting one to study from the perspective of island biogeography. Due to its isolated occurrence and its standing amongst the most basal (ancestral) of *Nepenthes* species (according to recent molecular studies, Meimberg and Heubl 2006; Meimberg et al. 2001), this species additionally represents a powerful model species to study the long-term effects of isolation on the evolution of species.

In the last issue (see Kapisen 17, pages 18-19), Mathias Scharmann introduced the biology of the Seychelles pitcher plant, and he noted that this species deserves more research attention as still very little is known about its life history, ecology and genetics. This lack of knowledge is in spite of its research potential, its visibility and status in the Seychelles (it has been pictured prominently on the Seychelles 100 rupee bank-note and often as a subject on popular post-office stamps), and it being classified as vulnerable in the IUCN Red List.



Figure 1. *Nepenthes pervillei* atop an inselberg in Mahé - exhibiting its characteristic inflorescence and pitchers. Indian Ocean in the background (H Luqman).

To better understand this species, how it compares to other *Nepenthes* species, how it survives and reproduces, and how it is affected by natural and man-made changes, a number of studies have materialised over the past few years that aim to investigate the biology of this and other *Nepenthes* species, increasingly taking advantage of genetics and next generation sequencing (NGS) technologies to do so.

In September of 2014, I visited the Seychelles together with Christoph Kueffer of ETH Zurich to collect samples of this plant with the aim of identifying distinct populations within Mahé and the degree to which these populations are connected, in order to fill in some of the knowledge gaps surrounding the plant's population structure, population viability (health) and genetic diversity. This field work was conducted as part of my Master's project which was to use NGS technologies, in my case a novel technique known as RAD sequencing, and genetics to inform conservation measures (this is known as **conservation genetics**). The field work was idyllic, especially having come from rainy Zurich. The plants grew, almost serendipitously, on only the most scenic of inselbergs and the views that awaited us when we reached our high elevation sampling sites often encompassed sweeping vistas of the island (see **Figure 2**).

With James Mougall of the Seychelles National Parks Authority to guide us, we were successful in acquiring samples (a small strip approximately 4-5cm long from one leaf) from a majority of the individuals on most of the inselberg sites where the species was known to grow. The sampling of a small bit of leaf from each plant was of negligible effect



Figure 2. Sweeping view of Mahé from a sampling site (H Luqman).

and non-harmful to the plant. We collected a total of 90 samples, which corresponded to 86 individuals, obtained from the sites of Congo Rouge, Copolia, Glacis d'Antin, Morne Blanc, Mont Jasmin, Mont Sébert, the Tea Plantation and Trois Frères. We estimated this conservatively to be within an order of magnitude of Mahé's total population, given the thoroughness of our sampling.

From this result, we estimated the total size of Mahé's population to be in the range of hundreds of individuals. If accurate, this is a very low number and should be a point of urgent conservation concern. Notably, a few inselbergs (such as Morne Blanc and Glacis d'Antin) were found to contain only very few individuals, albeit very large ones. These low estimates might sound surprising to many readers who may have observed large mats of pitcher plants on Mahé's inselbergs, but such observations, as we came to realise during our work, are often confounded by the presence of large individual plants that form whole carpets of pitchers, lianas and leaves on their own. Whilst superficially giving a semblance of many plants, these large individuals nevertheless carry only one set of genes that contribute to the overall species gene pool.

Once the samples were transported back to Zurich, DNA sequenced and analysed, several notable discoveries emerged. Based on genetic differences between the samples, there appeared to be three distinct genetic clusters of pitcher plants on Mahé. Intriguingly, these clusters did not strictly follow the geographic distribution of the individuals or the inselbergs they were sampled from. The individuals from Trois Frères formed one cluster, the individuals from the Tea Plantation formed another cluster and the individuals from the remaining 6 locations collectively formed the third cluster.

This clustering (or population) structure has several important implications. First, the Trois Frères and Tea Plantation plants are distinct relative to the other plants, and thus their conservation is important for maintaining the overall genetic diversity of pitcher plants in the Seychelles. The urgency for conservation of these sites will be dependent on whether these sites represent older naturally occurring populations or recent founder populations originating from established populations occurring elsewhere e.g. the island of Silhouette. If the case is the former, conservation priority should be on the Trois Frères and Tea Plantation sites, whereas if the case is the latter, conservation priority may be better placed at the established sites on Silhouette rather than the founded ones. Only further analyses of samples from Silhouette will determine this, and we hope to obtain samples from this island in the future.

While the population size for the Seychelles pitcher plant was found to be exceedingly low, the genetic diversity was actually discovered to be quite high, and much higher than the low population numbers would at first glance suggest. This is more favourable news and seems to indicate considerable changes in the recent demographic history of this species.

To address the discovered mismatch between the geographical clusters (e.g. the sites) and the genetic clusters, as well as the higher than expected genetic diversity (considering the very low numbers), my colleague at ETH, Mathias Scharmann and I employed various mathematical models to see whether the observed distribution and genetic diversity of plants could be a result of demographic history, and if so, what scenario of demography it would imply. Our demographic inference, while still tentative, suggests a fascinating tale of population splits and population declines. We

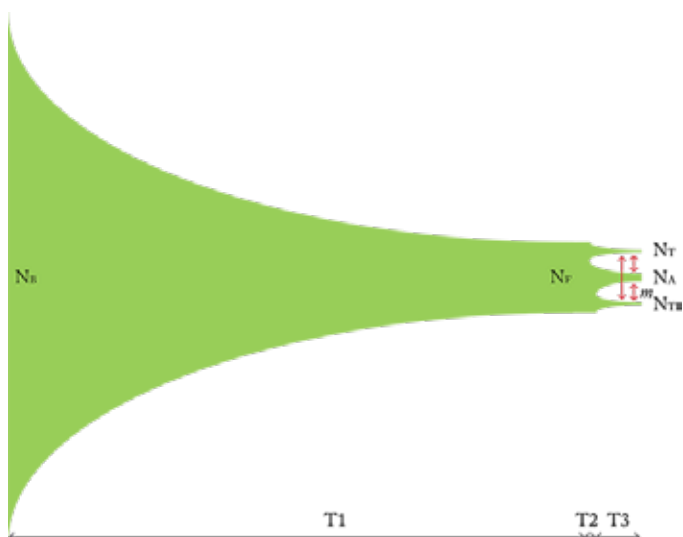


Figure 3. An illustration of the inferred demographic model (*not to scale*). The vertical width of the green plot represents the size of the populations (N_t), plotted against time (horizontal axis). The figure shows the long ancestral population decline, followed by the two almost simultaneous divergence events, and the subsequent population declines of the three diverged clusters, together with the inter-population migrations (red arrows) (H Luqman).

inferred a most likely demographic scenario whereby a single ancestral population of *Nepenthes pervillei* underwent a significant decline in population over a relatively long period of time, before undergoing two almost simultaneous divergence events to found the three clusters we observe today. Furthermore, all three diverged clusters then experienced further and substantial population declines (see **Figure 3**).

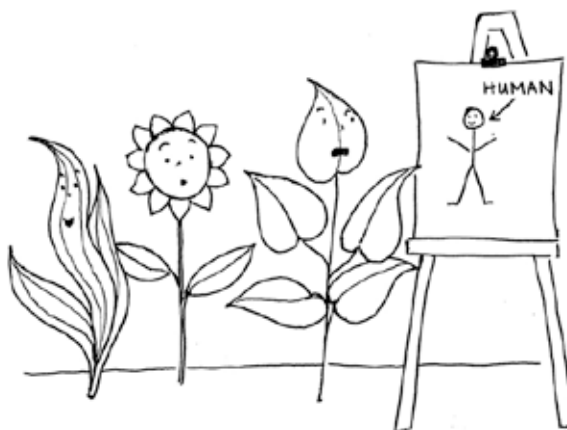
While revealing, these inferences still do not entirely explain the current spatial population structure of the Seychelles pitcher plant, and the inferred values from these mathematical models are not presented in absolute values. What is currently being investigated is how these inferred scenarios fit in with known historical and geological events, such as the arrival of humans in the 18th century which entailed an almost island-wide clearance of lower elevation forests, and the vast and gradual submergence of the Seychelles Bank and Mascarene Plateau (submerged oceanic plateaus on which the Seychelles lie) following the last glacial maximum starting around 20,000 years ago. What additionally needs to be ascertained is whether this species is indeed truly an inselberg species, or whether its current inselberg distribution is a result of the inselbergs' function as refugia from

micro-climatic changes, anthropogenic disturbances and/or competitive exclusion by invasive species. By acquiring information of the geological and human history of the Seychelles, by unravelling the genetic patterns within the plant's genome to infer the ancient evolutionary forces that have acted upon it, it is anticipated that the nebulous history of *Nepenthes pervillei* will soon be revealed. What is clear as of now is that the population size of the Seychelles pitcher plant is perilously low, and it should be of utmost importance for us to conserve this species now before it and its history are lost forever.

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Plant perspectives



Biosecurity – do you know enough about it?

PCA

With the recent plague of small ‘hairy caterpillars’ (*Euproctis sp.*) causing itching or painful rashes for many people living on Mahé and other islands, is this yet another biosecurity ‘wakeup call’ for Seychellois?

One would have thought that previous outbreaks of new pests over the past 10 years or so would have alerted people to the dangers of unwanted introductions. For example, there has been Papaya mealy bug (*Paracoccus marginatus*) (see Kapisen 15, p.20), Spiralling whitefly (*Aleurodicus dispersus*), Aubergine borer (*Leucinodes orbonalis*), and at least 2 species of Fruit fly (e.g. *Bactrocera cucurbitae*), all of which have affected home-growers and gardeners as well as farmers in the country. There has also been much comment and debate about the visible spread of invasive creepers, taking over roadsides and neglected properties, and the less obvious but equally disturbing spread of *Clidemia* (‘Fo watouk’) in Mahé forests. At least some of the recent introductions must relate to an increase in the volume and variety of goods coming into the country from all over the world.

Seychelles has a new Biosecurity Law in place (approved in 2014) and there is improved equipment and checking of goods and produce entering through the port and airport, but it takes time to build up the capacity to ensure compliance with new regulations, and enforcement of the law. Importing businesses and hotels, for example, need to ensure that everything is treated and cleared properly before entry, as well as the authorities undertaking better inspections. But each of us needs to take more responsibility as well. It is easy to bring new things into the country without realising what impact this could have - whether it is a few seeds in a pocket (pro-



Caterpillars *Euproctis sp.* (K Beaver).

ducing a lovely ornamental plant which then spreads everywhere), or a small aquarium fish from another country which competes with native species or introduces a new disease (see the following link for a New Zealand example: www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11459090). Travelling between the islands is just as likely to create a problem as travelling from another country - as you could be spreading a weed, pest or disease from one island to another.

It is not just things tucked into your pocket or suitcase. You could be carrying eggs, seeds and spores of tiny pests on your shoes, clothes or in your suitcase. So could tourists and business people coming to the islands. Therefore we ALL need to be more vigilant, more aware of the risks, and more willing to clean the soles of our shoes before travelling, for example, or report to the Greenline (Tel 2722111) a new plant or animal that we have seen. Our island flora and fauna is very vulnerable because it has developed in relative isolation for millions of years. Even introduced species we thought were benign have the potential to develop into invasive species after many years. One recent example is Ylang Ylang, the tall tree with the strong perfume we love to smell in the cool evenings, which is now rapidly invading Mahé forests.

So let us all take note, learn to be careful when we travel (even between islands), use our experience with ‘hairy caterpillars’ to help our children to understand, and perhaps introduce biosecurity into the science curriculum in schools, as it is only with ongoing education and good observation that we are going to combat the introduction of new problem species.



Biosecurity control at Seychelles International Airport (special X-ray machine + ‘declare or dump’ box) (Photo credit: UNDP-PCU stills from a documentary).

Front page of a CABI educational brochure

www.cabi.org/invasives



PCA News

The successful completion of one PCA partnership project

Our main project over the past year and a half has been our collaborative work with Le Jardin du Roi, a small tourism establishment in South Mahé (see Kapisen 16, p. 17; 17, p. 24). Part of this project is forest rehabilitation (see p. 21) and the other part relates to improving visitor experience at this beautiful spice garden and orchard with interesting historical connections. It has been a rewarding project in many ways (see p. 5) in spite of some slow progress at times. The culmination was an event on 21 May 2015, at which the Minister responsible for Environment, Mr Didier Dogley, was present to officially open the new facilities. Also present was Principal Secretary for Culture, Ms Benjamine Rose, and representatives from tour operators, National Parks, the Conservation Division, UNDP, the local Primary School and the media, as well as PCA members and the garden's staff. A new Memorandum of Understanding was signed between PCA and Le Jardin du Roi, reflecting the significant partnership which has developed, and which will continue for at least another two years thereby contributing to the sustainability of the project's achievements.



The official opening of Le Jardin du Roi's new visitor facilities:

From Left to Right: Bernard Georges, Minister Dogley, Mrs Micheline Georges (the current owner), Katy Beaver (PCA), P.S. Benjamine Rose.

..... And the start of another collaborative project

It is beneficial working with other groups of people, as a lot more can be achieved when skills are shared. Our new project involves a team from the Seychelles National Parks Authority (SNPA) and a local community, as well as PCA members. It revolves around the restoration of a precious, but threatened, type of vegetation found on the extensive rock and boulder areas in Seychelles known as 'glacis' (or inselbergs in geographical terms). They are difficult places for plants to live - hot burning sunshine, strong winds, and soil in small pockets. These conditions require special adaptations. So you might think that the specialised native vegetation of glacis would not be invaded by other plant species that have been introduced into Seychelles. Indeed, compared to forest areas with deeper soil and more shelter, where alien species have become almost totally dominant (see Kapisen 16, p.3-4), the glacis vegetation is remarkably resistant to invasion. However, unfortunately there are a few alien species which can stand up to the harsh conditions and have spread into the precious glacis habitats, threatening the native species: Prindefrans (*Chrysobalanus icaco*), Bwa zonn (*Alstonia macrophylla*), Cinnamon (*Cinnamomum verum*), Gouyavdesin (*Psidium cattleianum*), and more recently Fo watouk (*Clidemia hirta*) and Lemongrass (*Cymbopogon spp.*).



Glacis vegetation.

The aim of our project is therefore to remove all the alien plants from a 4 hectare glacis site near Morne Blanc, allowing the native species to recover and new seedlings to grow up. Also we will plant more native seedlings, especially of those species that have become rare on the glacis. The initial work is tough and requires a special method, as herbicide is applied in very small quantities to the cut bushes in order to kill the roots, so trained SNPA staff are doing this part. It has been found that without the herbicide the alien plants regrow quickly and if we keep returning to cut them back, we can easily trample any native seedlings that have sprung up.

By the end of May 2015 an area of around 3.5 ha had been cleared and the Port Glaud community can now become more involved in the project. We show people how to recognise the native plants of the glacis and the aliens, so that they can help to remove new alien seedlings, while avoiding trampling native seedlings. They learn about vegetation restoration at the same time. We will also offer community members training, for example in the propagation of native plants, so that people can grow them in their own gardens. Some native seedlings will be purchased by the project and others will remain in their gardens to bring pride and happiness. Eventually, community guardians will be identified to look after this precious site and a nature trail will be created so that everyone can visit and enjoy the restored glacis vegetation, along with the wildlife which will return to the area.



Port Glaud community members learn about plants (PCA).



SNPA staff removing alien plants from the glacis (C Kaiser-Bunbury).

Education and Awareness

Last year, 2014, was a busy year for PCA's outreach and awareness-raising activities (Kapisen 17, p. 21-22). So far 2015 has been somewhat calmer and much of our education and awareness work has been through the Jardin du Roi project (see p. 5) or as part of the glacis vegetation restoration project (previous paragraph). However, PCA set up a stall at an event for Earth Day organised by a community environmental group, and there has been another 3-day National Expo this year. The Eco-Village, where the PCA stall is situated, attracts many visitors who are eager to try out the hands-on activities which most environmental organisations, including PCA, create as part of their exhibitions.



The PCA stall at an Earth Day event in April (PCA).

Several of our PCA members have also spent numerous days in national workshops and environmental meetings over past months, trying to ensure that plants and plant conservation are not forgotten. Advocacy is an important part of our work as an NGO.

Mysterious vine

It is September 2014 and the herbarium team comprising of Charles and Bruno, is on one of their monthly field trips. This particular fieldwork was a bit special because the team was on Silhouette Island assisting a group of workers from nearby North Island to look for native seeds to be used in the vegetation rehabilitation programme on North. Of course everyone who knows Bruno will by now have realized that we are not following a trail, but rather finding our way the hard way, through boulders and roots, and we are heading up towards Mont Pot-a-Eau.

At one point, we came across a very bouldery area with a large population of *Bwa fourmi* (*Wielandia elegans*) and then not much further on, we discovered a plant - a creeper - which neither myself (Charles) nor Bruno could identify, but which Bruno believed might belong to the Asclepiadaceae or Apocynaceae family. As the plant was not flowering at the time, it was not possible to accurately identify it. So we definitely need to go back and hopefully find the plant with flowers, and from there we might be in a better position to have a name for our mysterious vine.



Leaves and leaf bases of the unknown vine (B Senterre).

Curious fungi

Fungi are fascinating organisms - their strange shapes and colours never cease to amaze. Katy Beaver found one species she has not seen before in Seychelles and Lindsay Chong Seng found another.

The first species appears as a pinkish white gelatinous 'egg', then the skin breaks open to reveal a spongy orange 'stem' with a strange latticework head. The fungus produces a smell to attract ants and flies that disperse the spores formed in the slimy green-brown parts between the orange lattices. The fungus is identified as a type of stinkhorn fungus, probably *Lysurus periphragmoides*, which has also been recorded from Mauritius and other tropical countries.

The second species remains as a large 'egg' on the ground and is probably a type of Earth Ball (perhaps a *Scleroderma* sp.) about 6 cm wide. The outer wall splits irregularly, showing black pea-like bodies inside, which produce the spores. Interestingly this type of fungus is supposed to form ectomycorrhizal associations with plants (see Kapisen 5, p. 6) so it will be good to return to the site and check the shrub and tree species present.



(both K Beaver)

The 'well known' Bwa dou

Bwa dou (*Craterispermum microdon*, Rubiaceae) is one of the most famous and most popular endemic species of Seychelles, at least to many older Seychellois. It is in the top three of the native species used in traditional medicine and is actually threatened by over-harvesting for such purposes. Yet it now appears that Bwa dou is not 1 species but at least 2, possibly 3. The research team at the Herbarium (Seychelles Natural History Museum) had already suspected the multiple identity of 'Bwa dou' in early 2009 (see specimen *Senterre 5492*), but it is only recently, during a PCA field trip to Praslin, that more detailed observations could be made to support that hypothesis. A lot of photos were taken (see www.seychellesplantgallery.com) and world specialists in the genus *Craterispermum* were contacted. Those specialists confirmed that the Bwa dou from Praslin was a distinct species from the Bwa dou of Mahé. Although the two plants look very much similar at first sight, the true *Craterispermum microdon* (from Mahé) has short inflorescences and reddish fruits, while the unidentified *Craterispermum* from Praslin has long inflorescences and bluish fruits. Even more interestingly, the Bwa dou from Silhouette (known from one specimen only) might well be a third species, but more material is required to confirm this and more studies will be needed if we want to clarify the true identity of the Bwa dou species in Seychelles. Unfortunately, local taxonomic research, which PCA and the Museum contributed to redevelop in Seychelles during the last few years, and which resulted already in a significant number of (re-)discoveries, is again being neglected and currently receives no funding. Several funding options are being explored to help continue developing our knowledge of the flora of Seychelles and we hope that these will materialize soon. This field note shows how even 'well known' species can still hide surprising secrets.



Craterispermum sp.1
(Praslin) (B Senterre).



Craterispermum microdon
(Mahé) (C Kaiser-Bunbury)

Newly spreading alien species

Bruno Senterre noticed recently that the invasive Pigeon orchid (*Dendrobium crumenatum*) was present in the higher parts of Mont Potao on Silhouette Island. Still relatively small in population size, it might be possible to eradicate before it spreads further. But care will be needed as the 'baby' plants of Pigeon orchid are difficult to distinguish from those of several endemic orchids.



Pigeon orchid in amongst endemic pitcher plants
(B Senterre).

Forest rehabilitation at Jardin du Roi in pictures

The forest nature trail at Jardin du Roi covers about 2 hectares. Only some trees have been cut, leaving others to give shade to small endemic palms already present and newly planted native plants.



Alien invasive trees are cut leaving the small native palms more light and less competition. Meanwhile native plants are grown in a nursery ready to plant out.



Holes are dug in the forest and young native plants are carried up the hill from the nursery



The native seedlings are planted in the holes and marked with sticks, and mulched when possible. Volunteer PCA members and friends, Jardin du Roi gardeners and the expert nurseryman all helped.



Native seedlings growing well but there are many weeds out there to compete with! Regular maintenance to remove the alien re-growth will be crucial.

Working on Anonyme Island

PCA member Andre Dufrenne has been working as an environment officer at Anonyme Island Resort, a private island in Seychelles, for the past seven months. Here he describes some of his work.

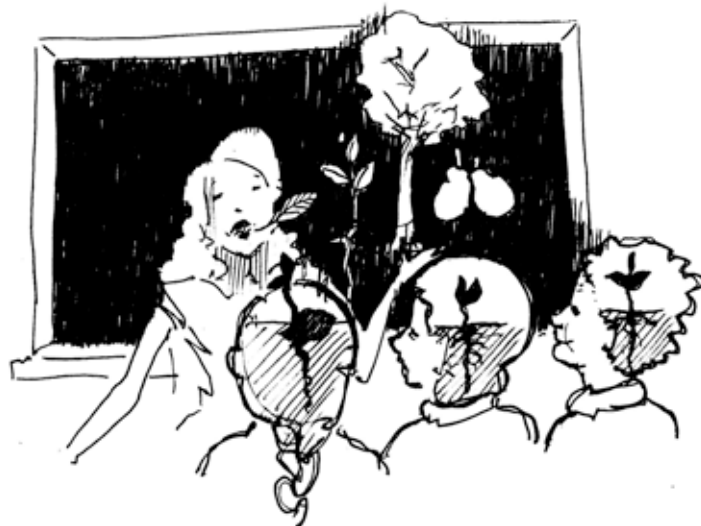
The island has many plants but few endemic species, as most are ornamentals that make the island attractive for visitors to explore. During the first plant survey that I conducted around the island I noticed that some plants species were badly affected by the mealy bug pest that arrived in the country around 2012 (see p. 16). The problem was: how to control it so that it does not spread to other species of plants. Do you cut the whole tree that is affected? Or do you think of a different method to deal with the pest?

My advice was to look for a pest control officer who is very professional to do the job. On Anonyme Island we have a pest control company coming regularly to spray around the island. Most of the plants that are affected by this mealy bug are frangipani and hibiscus. They use an insecticide called Pyninex, which has proved very useful to kill the pest. However it is harmful to birds and wildlife, so I have to monitor all the work that they do, to check that they do not kill any wildlife species that lives on the island. Now they take better precautions when they do that kind of job. The result that we noticed was excellent when we continued doing the surveys: no birds and wildlife had been found affected by this treatment. So my advice to all Resorts and plant nursery owners is "Don't just think you have to cut down your frangipani and hibiscus trees, you can always treat them... look for advice". You can compare the two pictures for yourself and see the changes.



Frangipani with mealy bug infestation before and after treatment (A Dufrenne)

Plant perspectives



Plant Conservation Action group – who we are and what we do

When we started: November 2002

Who we are: We are a voluntary membership organisation (NGO), with an executive committee elected every two years. We have monthly meetings and regular field trips.

Our mission: PCA mobilises action for the scientific research and conservation of plant species, and promotes community awareness of the fundamental importance of plants in Seychelles.

What we do:

- Plant species identifications
- Advice on vegetation rehabilitation
- Vegetation surveys and management plans
- Collaborative research and monitoring
- Hands-on training in practical plant conservation
- Promote awareness about plants and conservation
- Field trips for members and plant enthusiasts
- Advocate for plant conservation



Our current project: “Restoring endangered ‘glacis’ vegetation with involvement of the local community”

Website: www.pcaseychelles.org

See also: www.seychellesplantgallery.com

Contacts: pca.seychelles@gmail.com; Telephone +248 4241104 or +248 2574619



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