

Annual report for 2012



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Vahatra students

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We are very pleased to present our annual report for 2012. The Association Vahatra has just passed into its six year of formal existence and the activities during 2012 clearly demonstrate major advances and an important level of vitality. Notwithstanding the problems that have influenced Madagascar since 2009, Vahatra has been able to make very important advances in helping with the education and capacity building of young Malagasy scientists, as well as exploring aspects of the island's remarkable biological diversity. During the course of 2012, there have been major updates to the Vahatra website and you are cordially invited to explore (www.vahatra.mg). As you will discover, 2012 has been an important year for the association, with the balanced continuation of preexisting programs and new pedagogic and research activities. The association's publishing house continues to thrive. If you have any comments or questions, please do not hesitate to be in contact (associatvahatra@moov.mg). On the behalf of Vahatra, best wishes to you and your family for 2012.

A MESSAGE FROM THE PRESIDENT OF VAHATRA, ACHILLE P. RASELIMANANA, DR. HDR

The Association Vahatra celebrated in 2012 its fifth year of existence. For such a young organization, this is a crucial period to review advances, understand shortcomings, develop new challenges, and expand our vision of the future. The year 2012 was not without problems, like so many similar institutions in Madagascar; the impact of the worldwide economic crisis and the consequences of political-economic crisis that the country has endured



since 2009 notably impeded certain types of progress. For example, for security reasons, a field-training course scheduled several months in advance to take place in the southwest had to be cancelled -- literally at the last moment -- and strikes at the university delayed the start of the academic year and created a series of other problems.

On the positive side, 2012 saw the publication of the sixth volume of *Malagasy Nature*, a scientific journal of international standards published by the association to advance national and regional science and scientists, capacity, and information exchange. A critical step was taken, and starting with this new volume, all published articles can be downloaded from the Vahatra website in their pdf format and for free. This greatly reduces production costs, as with previous numbers, thanks to a grant from The John D. and Catherine T. MacArthur Foundation, we had the financial freedom to print, bind and then distributed free of charge. The move to publish on-line will dramatically decrease costs to produce the journal, and, we firmly believe, allow a greater exchange of information. This past year also saw the publication of a new volume in the Vahatra series "Guides sur la diversité biologique de Madagascar", this one on the Carnivora of the island. Further, there was a notable increase in the number of student visitors using Vahatra library and asking advice of its scientists, clearly underlines the expanding and pivotal role of the association in capacity building.

Even with all of the things on the social, economic, and political fronts happening around us, it was not difficult to find our daily rhythm to work closely with different students, advance on scientific research and fieldwork, and numerous other projects that form the passion and reason why the association exists. The year 2013 should produce some important and decisive changes for Madagascar -- the presidential election is scheduled for July and the national university system will move to a more international system of LMD. Vahatra continues to play an increasing role within the university system associated with capacity building and new south-south programs are planned with colleagues and students from the African continent and neighboring islands. We are very excited about these developments, which allow the association to meet its mandate "Advancing the science and develop national capacity to effectively contribute to the conservation and management of Madagascar's unique biodiversity."

LONG-TERM GOALS

The long-term goals of the Association Vahatra are to advance Malagasy scientists, specifically graduate students within the national university system, and make important advances in understanding the island's unique biota. Our sincere intent is to create an organization with a long-term future, both in the sense of a vision and financial base. A critical aspect to mention is that we have created this vision largely based on the scientists and students incorporated into the association, and, hence, profoundly Malagasy in perspective. This is in comparison, for example, to large international organizations that might not necessarily have the interests of Madagascar as their principal point of perspective. This aspect is fundamental for the long-term strength of the association, since members are engaged and committed by conviction with regard to the study and conservation of their natural heritage.

The seed was planted for Association Vahatra more than two decades ago in the context of a project organized by WWF-Madagascar and known as The Ecology Training Program (ETP). Steve Goodman and Achille Raselimanana were the coordinator of the project for many years, during which time several generations of Malagasy students finished their higher degrees within the Malagasy university system in animal and conservation biology. Many of these graduates are amongst the major actors in the current community of Malagasy conservation biologists. These individuals are now responsible for the advancement of new generations of national field biologists in three manners – 1) lecturers and professors within the national university system, 2) active scientific members of the Vahatra staff, and 3) playing important roles and holding key positions in the non-governmental and governmental sectors.

VAHATRA – PERMANENT STAFF

1. Professor Achille P. Raselimanana – President of Vahatra and Lecturer, Department of Animal Biology, The University of Antananarivo. Founding member. Achille was one of the first generation of ETP graduates and did his DEA and Ph.D. in the context of this program. In 2011, he presented his “Habilitation à Diriger des Recherches” (HDR) at The University of La Réunion, which is the

highest scientific degree in the French university system. Achille is a herpetologist with considerable experience in molecular systematics and worked as the Biodiversity Program Officer for WWF-Madagascar for almost ten years before the creation of Vahatra.

2. Dr. Marie Jeanne Raherilalao – Editor of the journal *Malagasy Nature* at Vahatra and Lecturer, Department of Animal Biology, The University of Antananarivo. Founding member. Marie Jeanne did her Ph.D. associated with the ETP. Marie Jeanne is an ornithologist working on ecology, biogeography, and systematics.
3. Dr. Voahangy Soarimalala – Scientific Coordinator at Vahatra; Head Curator, Department of Animal Biology, The University of Antananarivo; and Lecturer, The University of Fianarantsoa. Founding member. Voahangy did her DEA and Ph.D. associated with the ETP. Voahangy is a mammalogist with a particular interest in rodents and tenrecs.
4. Dr. Steven M. Goodman – Scientific Advisor at Vahatra and Lecturer, Department of Animal Biology, The University of Antananarivo and The University of Mahajanga. Founding member. Steve works with both mammals and birds and holds the post of MacArthur Field Biologist, Field Museum of Natural History, Chicago.
5. Mrs. Malalarisoa Razafimpahanana – General Secretary of Vahatra. Founding member. Malalarisoa formerly worked at WWF and transferred to Vahatra in October 2007. She is responsible for the administration of the association. Further, with considerable technical and aesthetic skills, she does the type setting of the journal *Malagasy Nature* and the different books published by the association.
6. Mr. Rachel Razafindravao called “Ledada” – logistic coordinator. Ledada started working with the ETP some 19 years ago and transferred to Vahatra in October 2007. He has helped organize logistics for well over 240 field missions to some of the remotest areas on Madagascar.
7. Mrs. Françoise Ramalalaitiana – domestic help. Françoise has worked with Vahatra since October 2007.
- 8-10. Mr. Elisa Malaimbohitsy, Mr. Mara Avisoa, and Mr. Mbola Marivosoa Alexandre – guardians.

11. Ms. Herivololona Mbola Rakotondratsimba – Consultant and GIS-specialist. Association Vahatra has hired her for a project to publish an atlas to selected endemic land vertebrates of Madagascar (see below).
12. Mr. Guy H. Randriatahina – Consultant and principal “biodiversity educator” in a project known as “Science for the people” (see below).
13. Mr. Pascal Rasolondraibe – “Biodiversity educator” assistant in the project “Science for the people”.

VAHATRA’S BOARD OF DIRECTORS

In order to provide needed guidance and counseling for the current and future programs associated of Vahatra, a Board of Directors was named, which includes the following individuals:

Malagasy members

Professor Daniel Rakotondravony – Department of Animal Biology, The University of Antananarivo.

Mrs. Nanie Ratsifandrihamanana – Director of Conservation, WWF, Madagascar.

General Guy Ratrimoarivony – Général de Corps d’Armée, Director of Strategy Seminar, Center for Diplomatic and Strategic Studies

Mrs. Chantal Andrianarivo – Former Head of Research and Biodiversity, Madagascar National Parks and now Technical Advisor at Western Indian Ocean Coastal Challenge – Islands Project.

Professor Joelsona Ratsirarison – Forestry Department of the School of Agronomy, University of Antananarivo.

Mr. Jean Chrysostome Rakotoary – General Director of the National Office for the Environment (ONE).

Professor Raelina Andriambololona – Institut National des Sciences et Techniques Nucléaires (INSTN), The University of Antananarivo, General Director of INSTN and Member of the Malagasy Academy.

Foreign members

Mr. John McCarter – Former president of the Field Museum.

Mr. Michael Polsky – President, Invenergy.

Mr. Olivier Langrand – Island Conservation.

Professor Jörg U. Ganzhorn – Professor, Tierökologie und Naturschutz, University of Hamburg.

The 2012 annual meeting of the Board of Directors will be held on 1 March 2013. There has been a slight delay associated with the coordination of a date that fits the program of the different members.

STUDENTS

We are currently working directly with different Malagasy students conducting their “Diplôme d’Etudes Approfondies” or DEA (roughly equivalent to a MSc.), “Professional licence” (DESS), and Ph.D degrees and registered within the national university system (see section below entitled “Active graduate students in 2012”). Further, the scientific members of Vahatra are also in contact with tens of other Malagasy students as secondary advisors and members of thesis and memoir committees. We have made a dedicated effort to work with undergraduate and graduate students in other provincial universities outside of Antananarivo, including Toliara, Fianarantsoa, and Mahajanga. In addition, Vahatra staff members advise many other Malagasy students with aspects of their research, access to literature, and other forms of advice.

Since Vahatra open its doors in late 2007, over 600 different student and research visitors not registered with the program have come to the office to use the library facilities or consult with the scientific staff. (These figures are based on a sign-in notebook we maintain.) As the Malagasy scientific community becomes more acquainted with Vahatra, there is an increase in the number of visitors. A sign of this is that nearly 350 people signed the register book in 2012 – this figure does not represent different individuals but the number of visits made during the year to consult the library. Steven M. Goodman also serves on the Ph.D. committees of students at The University of Kwa-Zulu Natal, where he is Honorary Professor; and other universities in North America and Europe; most of the research themes of these different Ph.D. projects are associated with Malagasy animals.

Students passing through the Vahatra program have considerable success finding permanent jobs within governmental and non-governmental sectors of Malagasy working society. In many cases, these

posts are in domains related to biology and conservation, for example, university appointments, working within NGOs, associated with the Madagascar National Parks program, etc. Hence, one of the initial mandates of the association, to advance science and conservation in Madagascar with focused mentorship of graduate students, is working. A good example of this is the number of university appointments Vahatra graduates have received in the past few years (Table 1), which provides the means to increase greatly the impacts of the program for goals of studying the island's unique biota and conserving it.

Table 1. Malagasy graduate students that worked with Vahatra and in the past few years obtained posts in the national university system. Most retain a sort of adjunct status at the Association Vahatra or continue research programs with Vahatra scientific members.

1. Zafimahery RAKOTOMALALA – Thesis title: Distribution des communautés des micro-mammifères dans l'Ouest de Madagascar: Détermination de l'implication des traits hydrographiques naturels dans les assemblages zoologiques – This thesis was presented in March 2010. Zafimahery has subsequently obtained the post of Professor in the Department of Animal Biology, The University of Antananarivo.
2. Harimalala Fanja RATRIMOMANARIVO – Thesis title: Inventaire des espèces de chauves-souris synanthropiques malgaches et étude de la variation morphologique, phylogéographique des quatre espèces de Molossidae dans des îles occidentales de l'Océan Indien et de l'Afrique – This thesis was presented in April 2010. The student was engaged in an 18-month post-doc associated with Vahatra. Before the termination of her post-doc, she was named as Professor at The University of Toliara.
3. Claudette Patricia MAMINIRINA – Thesis title: Etude systématique et phylogénétique de *Miniopterus* Bonaparte 1837 (Microchiroptera : Vespertilionidae) de Madagascar – This thesis was presented in April 2010. The student is currently engaged in an 18-month post-doc associated with Vahatra and has published a series of papers associated with her research. She has recently been named as a Lecturer at The University of Antananarivo.
4. Martin RAHERIARISENA -- Thesis title: Les petits-mammifères non-volants (Afrosoricida, Soricomorpha et Rodentia) dans le complexe forestier de la région de Loky-Manambato : biodiversité, biogéographie et effets de fragmentation forestière – This thesis was presented in March 2010. Martin has subsequently obtained the post of Lecturer in the Department of Animal Biology, The University

of Antananarivo. The student has published a few papers associated with the thesis topic.

5. Julie Ranivo RAKOTOSON – Thesis title: Révision taxinomique des espèces de Microchiroptera de la région sèche de Madagascar et leur écomorphologie. This was presented in 2007. Subsequently, she was named Grant Officer at the Madagascar Biodiversity Fund and then Lecturer at the Department of Animal Biology, The University of Antananarivo.
6. Hery Andriamirado RAKOTONDRAVONY - Thesis title: Etude de la distribution des communautés d'amphibiens et de reptiles à partir d'inventaires et analyses biogéographiques dans la région de Daraina. He worked for the Ministry of the Environment since 2011, Service Climate Changes, and recently was hired by the Madagascar Biodiversity Fund. He has been named as a Lecturer at The University of Antananarivo.

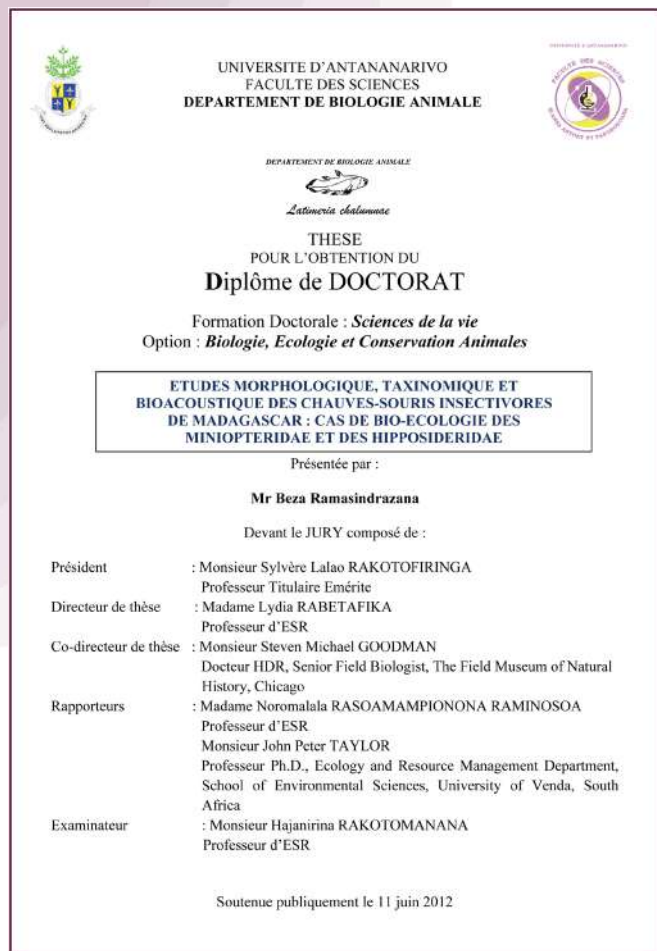
Active graduate students working in different manners with Association Vahatra and presentations made during 2012

As can be seen from the following lists, the scientific members of Vahatra are extensively involved in the advancement of a large number of Malagasy and international graduate students. We consider this the hallmark of the importance of the association in advancing graduate studies for a large cadre of young Malagasy scholars.

A-Professional licence, DEA, Ph.D. and HDR diplomas presented by student members of Association Vahatra

- Rakotozafy, L. M. S. Etude de la communauté des amphibiens pandanicoles dans la forêt humide de Maromiza, Moramanga. Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.
- Ramasindrazana, B. Etude morphologique, taxinomique et bioacoustique des chauves-souris insectivores de Madagascar : cas de bioécologie des Miniopteridae et des Hipposideridae. Thèse de Doctorat, Département de Biologie Animale, Université d'Antananarivo.





B-Professional licence, DEA, Ph.D. and HDR diplomas defended with implication of Vahatra scientific members as a supervisor, member of lecture committee or member of jury

Andriambelomanana, A. F. V. Etudes biométrique et génétique de trois populations de *Cyprinus carpio* dans la région de Vakinankaratra, M/car. Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.

Andrianaivoarivelo, A. R. Ecologie et population de *Rousettus madagascariensis* G. Grandidier, 1928 (Pteropodidae). Université de Rennes, France.

Block, N. L. Cryptic diversity and phylogeography in the Bernieridae, an endemic Malagasy passerine radiation. Ph.D. Thesis, The University of Chicago, Chicago.

Jacquet, F. Phylogéographie, taxonomie et évolution morphologique de trois complexes d'espèces de musaraignes du genre *Crocidura* (Mammalia, Soricomorpha) en Afrique subsaharienne. Ecole Doctorale Sciences de la Nature et de l'Homme – ED 227, Museum National d'Histoire Naturelle.

Nesi, N. Systématique et phylogéographie des chauves-souris africaines de la sous-famille des Epomophorinae (Chiroptera, Pteropodidae). Docteur du Muséum d'Histoire naturelle, Paris.

Rabeatoandro, Z. Etude des Ceratopogonidae de Madagascar: Taxonomie, Biogéographie et Ecologie. Thèse de Doctorat, Département de Biologie Animale, Université d'Antananarivo.

Raholdina, A. M. F. Etude écologique et analyse structurale de la population de *Furcifer campani* (Grandidier, 1872) sur le massif d'Ankaratra (Madagascar). Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.

Rakotoarinia, R. M. R. Influences de la fragmentation de l'habitat sur le comportement alimentaire de *Propithecus diadema* dans la forêt d'Ambatovy-Analamay. Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.

Rakotoarivelo, F. Biogéographie, évolution et systématique du genre *Jumellea* Schltr. (Angraecinae, Orchidaceae) dans le « Hot-Spot. Faculté des Sciences et des Technologies, Unité Mixte de Recherche, Peuplements Végétaux et Bioagresseurs en Milieu Tropical, Université de La Réunion.

Rakotomalala, H. E. Etude de la communauté d'Anatidae sauvages du Lac Alaotra à Madagascar et risques épidémiologiques associés. Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.

Rakotondraibe, V. P. Diagnostic biologique des Vertébrés d'Analaso, Parc National de Tsimanampetotse. Mémoire de licence professionnelle en environnement, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.

Ramanana, A. M. A. Etude de la structure génétique des deux populations de Boidae dans le marais de la zone humide de Torotorofotsy et de la Réserve de Biosphère

de Mananara Nord. Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.

Ramilison, M. L. Contribution à l'étude de comportement alimentaire d'*Indri indri* (Gmelin, 1788) dans le site minier d'Ambatovy-Analamay. Mémoire de licence professionnelle en environnement, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.

Randriamady, A. N. J. E. Etude comparative des communautés micromammaliennes (Afrosoricida et Rodentia) de la bordure et de l'intérieur de la forêt sèche de Kirindy CNFEREF, Madagascar et détermination du domaine vital de *Tenrec ecaudatus* (Schreber, 1777). Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.

Randriamiharisoa, L. O. Effets de bordure et de la piste de transhumance sur la communauté aviaire du Parc National de Tsimanampetsotsa. Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.

Randrianaina, H. S. Contribution à l'étude de la communauté des petits mammifères dans la forêt d'Ankazomivady, Ambositra. Mémoire de licence professionnelle, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.

Randrianjafison, E. Contribution à l'étude de la variation temporelle



de structure de la population des Afrosoricida dans la forêt d'Ankazomivady, Ambositra. Mémoire de licence professionnelle en environnement, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.

Rasoanasolonirainy, M. R. Contribution à l'étude de la communauté d'oiseaux d'eau dans le site minier d'Ambatovy. Mémoire de licence professionnelle en environnement, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.

Rasoloarison, H. Contribution à l'étude de la structure de population et du régime alimentaire de *Propithecus tattersalli* dans la Station Forestière à usage multiple de Loky-Manambato. Mémoire de licence professionnelle, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.

Ravolaharifeno, E. Contribution à l'étude du mode de vie en captivité de *Mantella aurantiaca* (Mocquard, 1900). Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.

Sama, Z. Biologie de conservation d'une espèce menacée d'échassier endémique: Le Gravelot de Madagascar *Charadrius thoracicus* (Richmond, 1896). Thèse de Doctorat, Département de Biologie Animale, Université d'Antananarivo.

Saneho, H. G. Contribution à la variation temporelle de la structure de la population des Rongeurs dans la forêt d'Ankazomivady, Ambositra. Mémoire de licence professionnelle en environnement, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.

C-Professional licence, DEA, Ph.D. diplomas in preparation in direct collaboration with scientific members of the Associated Vahatra

Andriafidison, D. Ecologie et conservation des gîtes dorts de *Pteropus rufus* (Pteropodidae) dans les différents écosystèmes de Madagascar. Thèse de Doctorat, Département de Biologie Animale, Université d'Antananarivo.

Andriahatrika, F. S. Contribution à l'étude des différents groupes d'*Eulemur rubriventer* dans la forêt de Sahavondronina, Ambatovaky, Fianarantsoa. Mémoire de licence professionnelle, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.

Andrianaivo, B.T.D. Micromammifères du Haut Plateau et les maladies émergentes. Thèse de Doctorat, Département de Biologie Animale, Université d'Antananarivo.

Fitahiantsoa, M. G. Variation de la communauté des petits mammifères suivant la structure des microhabitats. Mémoire de licence professionnelle, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.

Kofoky, A. **Ecologie des chauves-souris d'Andranomanintsy, Besalamy.** Thèse de Doctorat, Département de Biologie Animale, Université de Toiliara.

Latoroson, O. F. Les effets de la reforestation sur la population des lézards dans la région de Kianjavato. Mémoire de licence professionnelle en environnement,

- Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.
- Naidoo, T. Genetic diversity of the *Chaerephon leucogaster/pumilus* complex from mainland Africa and the western Indian Ocean islands. Ph.D. Thesis, The University of Kwa-Zulu Natal.
- Rabearisoa, P. A. Contribution à l'étude du régime alimentaire des *Couas* arboricoles de Madagascar. Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.
- Rabearivony, J. Etude bio-écologique et conservation des caméléons dans les habitats écotoniques de rivières malgaches. Thèse de Doctorat, Département de Biologie Animale, Université d'Antananarivo.
- Radafiarimanana, H. J. C. Ecologie et préférence en habitat de *Calumma hilleniusi* Brygoo, Blanc et Domergue (1973) sur le Massif de l'Ankaratra. Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.
- Rakotoarisoa, G. Génétique et dynamique de population de *Propithecus coquereli* Milne-Edwards, 1867 dans les fragments forestiers du Nord-ouest de Madagascar. Thèse de Doctorat, Département de Biologie Animale, Université d'Antananarivo.
- Rakotonandrasana, R. E. N. Etude de l'effet du changement climatique sur la distribution des espèces de reptiles et d'amphibiens dans les parcs nationaux d'Andringitra, d'Andohahela et de Montagne d'Ambre. Thèse de Doctorat, Département de Biologie Animale, Université d'Antananarivo.
- Ralph, T. Molecular systematics and ecology of *Otomops* (Chiroptera: Molossidae) in the Afro-Malagasy region. Ph.D. Thesis, The University of Kwa-Zulu Natal.
- Ramanana, T. L. Evaluation des effets des changements climatiques sur la diversité et la distribution des petits mammifères non volants (Rodentia, Afrosoricida et Soricomorpha) suivant les transects altitudinaux dans les massifs montagnards de la Montagne d'Ambre, d'Andringitra, et d'Andohahela. Thèse de Doctorat, Département de Biologie Animale, Université d'Antananarivo.
- Ramasinatrehina, N. S. Contribution à l'étude écologique de *Mentocrex beankaensis* (Aves, Rallidae) dans la forêt de Beanka, Région Melaky. Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.
- Randriamoria, T. M. Eco-morphologie de la communauté des petits mammifères dans les paysages fragmentés dans les régions de Moramanga. Thèse de Doctorat, Département de Biologie Animale, Université d'Antananarivo.
- Randriamandimbimahazo, R. Etude bio-écologique des communautés de Vertébrés et Invertébrés terrestres dans un écotone savane-forêt sèche de Beanka, Région Melaky. Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.
- Randriananioandro, N. C. A. Etude de la population du gecko géant *Uroplatus giganteus* dans la forêt sèche de Beanka, Madagascar. Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.
- Randrianarijaona, M. J. P. Effet des bordures sur la communauté des petits mammifères du PN de Ranomafana. Mémoire de licence professionnelle, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.
- Randriandimbimahazo, R. Etude bio-écologique des communautés de vertébrés et d'invertébrés terrestres dans l'écotone savane-forêt sèche de Beanka, Région Melaky. Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.
- Rasoma Rahantavololona, V. J. Relation entre *Astrochelys radiata* (Testudinidae) et la végétation au Parc National de Tsimanampetsotsa. Thèse de Doctorat, Département de Biologie Animale, Université d'Antananarivo.
- Razanadravoninirina, D. A. Elevage en captivité d'une grenouille endémique de Madagascar, *Mantella viridis* (Pintak et Böhme, 1988). Mémoire de diplôme d'études approfondies, Département de Biologie Animale, Université d'Antananarivo.
- Richards, L. Beyond DNA sequencing: Integrative approaches to resolving selected higher and lower taxonomic problems in Afrotropical Chiroptera. Ph.D. Thesis, The University of Kwa-Zulu Natal.
- Soavinarivo, N. L. Modèle de répartition des oiseaux d'eau dans la région de Bemanevika, Bealanana. Mémoire de licence professionnelle en environnement, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.
- Tantely, M. L. Biologie des moustiques vecteurs potentiels du virus de la Fièvre de la Vallée du Rift (FVR) à Madagascar. Thèse de Doctorat, Département de Biologie Animale, Université d'Antananarivo.
- D- Presentations made by Vahatra scientific members**
- Goodman, S. M. An overview of the biota and research developments on Madagascar. Presentation made in Antananarivo to group visiting from The Australian National Museum.
- Goodman, S. M. Understanding and expressing the world around us: the interface between the arts and sciences. Interlochen Arts Academy, Interlochen, Michigan, during a conference entitled "Information, Space & Time".
- Goodman, S. M. An overview of the biota and research developments on Madagascar. Presentation to recently arrived Peace Corps volunteers, Mantasoa.
- Goodman, S. M. Overview of Madagascar - geology, human influence, and biodiversity. Tropical Biology Association course at Kirindy, November 2012.
- Goodman, S. M. The bat fauna of Madagascar. Tropical Biology Association course at Kirindy, November 2012.

Goodman, S. M. Fenêtres sur les animaux extraordinaires et les écosystèmes récemment disparus de Madagascar. Opening lecture, journées scientifiques sur les maladies infectieuses dans la région Sud-ouest de l'Océan indien, Université de La Réunion, St. Clotilde, La Réunion.

Goodman, S. M. Les animaux disparus de Madagascar. Forestry Department of the School of Agronomy, The University of Antananarivo.

Raherilalao, M. J. & S. M. Goodman. Importance of forest corridors in conservation of bird communities: the case of forest-dwelling species. Pan-African Ornithological Congress, Arusha, Tanzania.



MALAGASY NATURE

Our intention with the scientific review *Malagasy Nature* is to publish in Madagascar a peer-reviewed journal including articles of high scientific and technical standards. Manuscripts in French or English are passed through a review and editorial process. We work closely with Malagasy authors, particularly graduate students and young researchers, to help them understand the process of composing, writing and editing scientific articles. In many cases, the first publication of a researcher poses numerous problems and *Malagasy Nature* provides the means for these individuals to navigate across this hurdle. On the basis of this approach, this journal play an important role in regional capacity building, which in turn separates it from other journals of international standards. Further, the journal allows Malagasy scientists to return information to the scientific world, rather than only being on the receiving end. We consider this a very important professional step for the Malagasy scientific community. *Malagasy Nature* also guarantees the local availability of results of ecological and biological research conducted on the island, as

in many cases articles and associated data published in foreign scientific journals are not repatriated to Madagascar.

Marie Jeanne Raherilalao is the Editor of *Malagasy Nature* and she is assisted by a group of Associated Editors. At least one volume of the journal is published each year. The editorial board of *Malagasy Nature* is composed of both national and international scientists, from the Anglophone and Francophone worlds, made up of the following individuals:

Head editor

Marie Jeanne Raherilalao

Associated editors

Steven M. Goodman

Achille P. Raselimanana

Malalarisoa Razafimpahanana

Voahangy Soarimalala

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Henry Wright
Chantal Radimilahy

Paleontology

John Flynn
David Burney

Malagasy Nature

Volume 6 - 2012



Volume 6 (2012, 132 pp.)

The most recent issue of the journal was published in December 2012 and contains the following articles:

- **Un premier aperçu de la faune de vertébrés du bush épineux de Salary-Bekodoy, à l'ouest du Parc National de Mikea, Madagascar** - Achille P. Raselimanana, Marie Jeanne Raherilalao, Voahangy Soarimalala, Charlie J. Gardner, Louise D. Jasper, M. Corrie Schoeman & Steven M. Goodman
- **Phenology of different vegetation types in the dry forest of Andohahela National Park, southeastern Madagascar** - Tahiana Andriaharimalala, Edmond Roger, Charlotte Rajeriarison & Jörg U. Ganzhorn
- **Three new *Aloe* species from Madagascar** - Rokiman Letsara, Solofo Rakotoarisoa & Frank Almeda
- **Etudes dendrométriques et dendrochronologiques de neuf espèces de *Commiphora* Jacq. (Burseraceae) dans les forêts sèches de l'Ouest de Madagascar** - Fenonirina Rakotoarison, Harisoa Ravaomanalina, Edmond Roger & Bakolimalala Rakouth
- **Influence de la variabilité climatique sur la phénologie de la forêt de la Réserve Spéciale de Bezà Mahafaly** - Notahinjanahary Rasamimanana, Joelisoa Ratsirarson & Alison F. Richard
- **Can differences in floristic composition explain variation in the abundance of two sympatric mouse lemur species (*Microcebus*) in the Ankarafantsika National Park, northwestern Madagascar?** - Lalandy Chanu, Dethardt Goetze, Charlotte Rajeriarison, Edmond Roger, Sandra Thorén, Stefan Porembski & Ute Radespiel
- **Bio-écologie des chauves-souris du Parc National de Tsimanampetsotsa. 1. Identification bioacoustique et habitat préférentiel** - Beza Ramasindrazana & Steven M. Goodman
- **Bio-écologie des chauves-souris du Parc National de Tsimanampetsotsa. 2. Variation interspécifique et saisonnière du régime alimentaire** - Beza Ramasindrazana, Balsama Rajemison & Steven M. Goodman

- **Sighting of a ring-tailed vontsira (*Galidia elegans*) in the gallery forest of Berenty Private Reserve, southeastern Madagascar (*Ploceus sakalava*)** - Anna V. Schnoell
- **Two records of albinism in Malagasy birds** - Gilbert Razafimanjato, The Seing Sam, Lily-Arison Rene de Roland & Juilot Ramamonjisoa

Important change in the publication of *Malagasy Nature*

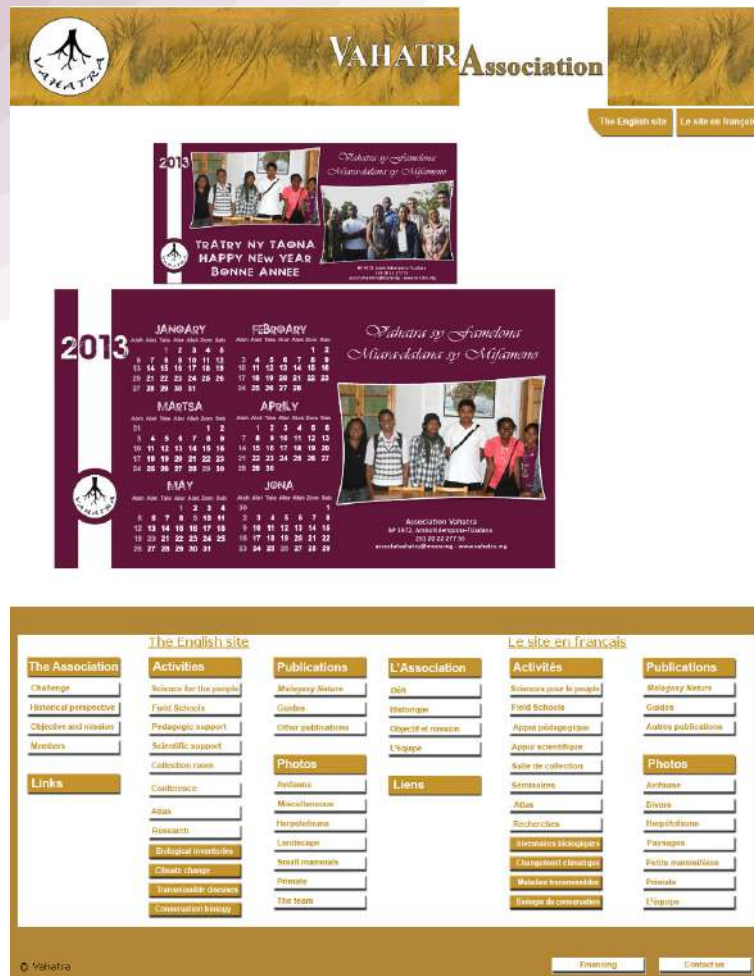
One of the principal purposes of the journal *Malagasy Nature* is to disseminate information to scientists, naturalists, researchers, and students working on and interested in the biodiversity of Madagascar and neighboring islands. Over the past years, we have printed each issue of the journal and sent hard copies to our registered readers. With this 2012 issue, volume 6, an important change has taken place.

Given the considerable costs of printing and postal charges, as well as certain potential readers not have access to printed copies of the journal, we have decided to go on line. Posted versions of the different published articles are accessible for free downloading from the Vahatra website (<http://www.vahatra.mg/volume6.html>) for

volume 6 and future issues. A certain number of printed versions of special numbers of the journal, particularly biological inventories, may still be printed for special distribution. We hope that this change from printed copies to downloadable pdf versions of the journal will increase access for different readers. Back issues of the journal (volumes 1-5) will not be posted and still can be obtained by contacting our editorial offices.

WEBSITE

Vahatra has updated their bilingual website (English and French) for the dissemination of information on its pedagogic and research activities. The site address is: www.vahatra.mg. Mrs. Razafimpahanana was responsible for creating and constructing the website. As she is the site webmaster, it is a simple manner for Vahatra to add new information and update existing pages. We welcome your comments on the site and its contents.



THE PUBLISHING HOUSE OF ASSOCIATION VAHATRA

The year 2011 marked an important advancement for the Association Vahatra with the creation of its own publishing house. The first major project is a series entitled "Guides sur la diversité biologique de Madagascar" [Guides to the biological diversity of Madagascar].



For individuals that have grown up over the past 40 years in North America or western Europe, information on regional faunas and floras was readily available in a remarkable number of field guides. These types of books, generally arranged thematically by taxonomic group (e.g. ferns, reptiles, birds, etc.) and region, revolutionized making information on biodiversity available and penetrable by members of different age groups in these respective societies. These guides provide an in-depth window into a variety of organisms, the means for individuals to become familiar with different groups near where they live or travel, and, most critically, integrating this familiarity into how they conceive the beauty and importance with the natural world. It is not an exaggeration to state

that these types of guides have led to the “greening” of numerous sectors of western society. For a country that is so rich in plants and animals, as well as of being of international conservation concern, the lack of such books is an enormous void that the Association Vahatra strongly believes need to be filled.

In 2011, three different books were published in the series, which is edited by Marie Jeanne Raherilalao and Steven M. Goodman and designed and typeset by Mrs. Malalarisoa Razafimpahanana:

1. *Les chauves-souris de Madagascar* [The bats of Madagascar] by Steven M. Goodman, 2011, 129 pp.
2. *Les petits mammifères de Madagascar* [The small mammals of Madagascar] by Voahangy Soarimalala and Steven M. Goodman, 2011, 176 pp.
3. *Histoire naturelle des familles et sous-familles endémiques d'oiseaux de Madagascar* [The natural history of the families and subfamilies of endemic Malagasy birds] by Marie Jeanne Raherilalao and Steven M. Goodman, 2011, 146 pp.

The intent of the series is further explained in the introduction to the books mentioned above:

“Over the past decades enormous strides have been made in documenting and describing the flora and fauna of Madagascar, aspects of ecological communities, and the origin and diversification of the multitude of species on the island. Much of this information has been presented in technical scientific papers or books, which are not accessible or penetrable to many people interested in pure natural history. Further, these books, which are only occasionally available in local bookshops, are expensive and often written in English. On the other hand, a considerable effort has been made to diffuse information to school children on ecology, conservation, and the natural history of the island through journals and clubs such as *Vintsy* organized by WWF-Madagascar. In our opinion, an important void needs to be filled between these two extremes, providing interesting and not highly scientific overviews on the extraordinary biodiversity of Madagascar. That is the intent of the current series and a glossary is presented in the final section to help with the definition of certain technical terms that are presented in the text in bold script.

ASSOCIATION VAHATRA
GUIDES SUR LA DIVERSITE BIOLOGIQUE DE MADAGASCAR

LES CARNIVORA DE MADAGASCAR



STEVEN M. GOODMAN

We strongly believe that in order to aid with the dissemination of information to the Malagasy people about their natural patrimony, aiding with the “greening” of views associated with resource utilization and conservation implementation, it is critical that more pedagogic books are available at reasonable prices. We hope that this series will play a role in meeting these goals.”

A fourth volume entitled “Les Carnivora de Madagascar” [The Carnivora of Madagascar] by Steven M. Goodman was published in the first half of 2012.

NEWSMADA
LES ACTUS DE MADAGASCAR

<http://www.newsmada.com/carnivora-de-madagascar-les-especes-endemiques-figurent-sur-la-liste-rouge-de-luicn/>

Carnivora de Madagascar : les espèces endémiques figurent sur la liste rouge de l’UICN

Les Carnivora de Madagascar comptent 13 espèces dont trois ont été introduites par l’homme dans le pays et dix autres sont totalement endémiques. La plupart des espèces endémiques menacées figurent sur la liste rouge de l’Union internationale pour la conservation de la nature (UICN) en 2011. Et ce, face à la dégradation de leur habitat naturel qui accentue leur fragilité démographique.

LES CARNIVORA DE MADAGASCAR
STEVEN M. GOODMAN

Toutes les espèces endémiques ne vivent que dans les forêts relativement intactes et la plupart sont dans la liste rouge des espèces menacées de l’UICN. La dégradation des écosystèmes forestiers, leur fragmentation, mais aussi les pressions particulières sur ces Carnivora comme la chasse et le piégeage accentuent encore cet état de fait sur leur fragilité démographique. En fait, « cette dégradation de leur habitat naturel et la distribution restreinte de certaines d’entre elles ne jouent pas en faveur de la survie à long terme des espèces vulnérables », a expliqué l’un des éditeurs du guide, Marie Jeanne Raherilalao, membre de l’association Vahatra. Les Carnivora peuvent ainsi provoquer des dégâts importants dans les élevages de volailles dans les milieux ruraux environnants de leurs sites naturels.

Une valeur patrimoniale

En premier lieu, il s’avère indispensable de distinguer la différence entre le groupe taxonomique Carnivora et les animaux qui ont un régime alimentaire carnivore. Un Carnivora, comme les auteurs le décrit dans le guide qui a été présenté officiellement, le 8 juin dernier au siège de l’association « Vahatra » à Ambohidempona, contient un groupe diversifié d’animaux et le terme est dérivé du latin, « *carni* » qui signifie chair et « *vora* » qui signifie dévorer. Les espèces de Carnivora sont placées dans la famille endémique des Eupleridae qui n’existe que dans la Grande île comme les « *fosa* », les « *jaboady* » ou encore les « *vontsira* ». Les trois autres qui ont été introduites à Madagascar par l’homme sont les chiens, les chats et la civette indienne.

Comme l’a expliqué le guide, les Carnivora endémiques de Madagascar sont des animaux uniques avec certains aspects extraordinaires de leur histoire naturelle et de leur évolution. Ils font partie intégrante du patrimoine naturel unique au monde ayant une valeur pour le peuple malgache, selon les éditeurs du guide. En plus, ils participent activement au fonctionnement écologique des écosystèmes forestiers et, à travers ce livre, les Malgaches pourront connaître davantage leur richesse inestimable en vue de la préserver pour les générations futures.

Noro Niaina

Ao Raha
Alatsinainy 11 juna 2012 Laharano 2042

TONTOLO IAINANA Mihalany tamin-gana ireo biby mihina-nolo

Mianana anjara toerana amin’ny fandrindrana ny zava-boahary ao anatin’ny natiora ireo karazam-biby mihina-nolo toy ny fosa, ny sakadia, ny fanaloka, ny jaboady, “Mampitsoa ny fifandrajajana ireo zava-boahary izy ireny amin’ny alalan’ny fihinanana ireo babay ambanany. Miparoka ny firoboroboan’ny karazam-biby izay mety hanakoronana io fifandrajajana io toy ny vavabo, izany”, hoy Raherilalao Marie Jeanne, miparoka eo anivany fihinanana Vahatra.

Mitady ho lany tamin-gana anefa ny sasan-tasany amin’ireo biby mihina-nolo ireo nolo ny fandrifipahana ny ala sy ny famoronan’ny mihina-nolo ireo biby mihina-nolo miditra an-tanàna, ka mandringana ireo biby fiompy. Izany indrindra no antony namoahan’ny fikambanana Vahatra ny boky “Les Carnivora de Madagascar”, mampahafantatra ireo karazam-biby mihina-nolo sy ny tombony amin’ny fiarovana azy. Boky 1- 500 no natonta.

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« Carnivora » de Madagascar

Un patrimoine unique menacé par la crise biologique

L’association Vahatra a sorti le guide « Les carnivora de Madagascar » son quatrième livre d’une série de publication sur la biodiversité faunistique malgache. Composé de 158 pages, ce guide se veut un instrument facile à exploiter par les étudiants ainsi que le grand public.

Ce livre a été écrit par l’un des plus grands experts en biodiversité malgache, Steven M. Goodman, a décrit avec précision l’histoire naturelle, l’évolution, ainsi que la situation actuelle des mammifères carnivores terrestres de Madagascar. « Carnivora » a une signification distincte du carnivore car cette appellation désigne exclusivement les mammifères carnivores terrestres », précise Marie Jeanne Raherilalao enseignant-chercheur au département de Biologie animale de l’université d’Antananarivo, en commentant le livre.

Reputé comme étant des prédateurs, les 10 espèces de mammifères carnivores qu’il n’existe nulle part ailleurs qu’à Madagascar sont considérées comme étant toutes menacées par l’extinction. Trois espèces sont présentes dans l’annexe II de la convention CITES sur la commerce des espèces sauvages, et 8 sont menacées d’être inscrites dans la liste rouge de l’Union internationale pour la Conservation de la Nature (UICN) dont 01 en danger, 03 vulnérables, 03 quasi-menacées, 01 à préoccupation mineure, 02 espèces par synonymie, et 01 nouvelle espèce. Pour ces dix espèces vivantes, aucune extinction n’a pas encore été enregistrée.

mais leurs répartitions se réduisent de plus en plus. Par contre, le plus grand des carnivora de Madagascar, s’agissant du *Cryptoprocta ferox*, est déjà considéré comme éteint car les chercheurs n’ont découvert que des restes d’os de cet animal qui aurait la même forme que le *Cryptoprocta ferox* actuel mais avec une taille relativement plus grande.

10 espèces endémiques et 03 introduites

Treize espèces de carnivora vivent à Madagascar dont 10 endémiques et 03 introduites. Classées dans une seule famille « Eupleridae » endémique de Madagascar, les carnivora autochtones sont diversement variés et répartis en trois formes différentes dont Felidae, Viverridae, et Herpestidae. Le *Cryptoprocta ferox* qui pèse jusqu’à 8 kilos ressemble à un petit puma, d’autres comme la genre de Galidia ont le corps d’une mangouste, et le *Fossa fossana* rappelle l’apparence d’une civette.

En ce qui concerne les espèces introduites, l’on peut citer le chien *Canis lupus*, les chats sauvages et domestiques *Felis silvestris* et *Felis domesticus*, ainsi que la civette indienne *Viverricula indica* connu sous l’appellation locale Jaboady. Certains chats et chiens domestiques qui se retrouvent à l’état sauvage deviennent des espèces envahissantes avec le Jaboady et le *Felis silvestris*. L’origine des carnivora de Madagascar reste encore un sujet de débats, néanmoins deux hypothèses différentes semblent être les plus probables. L’une concerne l’arrivée des ancêtres de ces espèces par la mer ou par route naturelle depuis l’Afrique. L’autre hypothèse, plus scientifique, est basée sur des résultats d’études de génétique moléculaire, avance que les trois familles auraient un ancêtre commun qui aurait évolué vers la radiation adaptative.

La pression humaine comme principale menace

La crise de la biodiversité liée à la pression anthropique constitue la principale menace pour les carnivora de Madagascar. En effet, cer-

taines espèces comme le *Cryptoprocta ferox*, *Fossa fossana*, *Galidictis fasciata* et *Geogalea* sont particulièrement sensibles à la fragmentation de leur habitat naturel due à la destruction de la forêt. Les pratiques de subsistance, dont la fabrication de charbons de bois et bois de chauffage, la culture sur brûlis, ainsi que la création de pâturage et la présence de bétail dans les forêts primaires, ont été considérées comme étant à l’origine de la déforestation à Madagascar. Depuis la crise socio-politique de 2009, l’exploitation commerciale des ressources naturelles et minérales est devenue une nouvelle cause de la crise de la biodiversité dans la Grande île. En deuxième lieu, la chasse devient de plus en plus une menace pressante pour ces Eupleridae. Les gens des campagnes les chassent à la fois pour la viande de brousse ainsi qu’une mauvaise réputation qui leur est attribuée. En effet, les carnivora notamment le *Cryptoprocta ferox* sont accusés à tort ou à raison comme étant des « mangeurs » d’animaux domestiques surtout le volaille.

A part la chasse, des maladies comme la toxoplasmose, le carie, la calicivirus féline, la parvovirose canine et même l’antrax seraient transmises par les animaux domestiques introduits et pèsent lourd sur les espèces endémiques. En effet, ces animaux ne sont pas naturellement immunisés contre ces maladies. Enfin, les espèces envahissantes constituent des concurrents de taille voire des prédateurs pour certains carnivora endémiques. Le *Viverricula indica* (Jaboady) une espèce envahissante, ainsi que des chiens errants et chats sauvages seraient à l’origine de nombreux cas d’attaques de poulaillers qui amènent les gens à ne pas aimer le *Cryptoprocta ferox*.

Des histoires exagérées

Les carnivora ont une mauvaise réputation, dans certaines traditions malgaches. Ils sont considérés comme étant les méchants de la forêt, « destructeurs » d’animaux domestiques et parfois associés à des monstres mythiques. Certaines croyances de la population du Sud-est affirment même que le plus grand des carnivora malgache est capable d’attaquer un village tout entier afin de prendre les nouveau-nés, ou encore de détruire les cimetières pour en voler les cadavres.

Jusqu’à aujourd’hui, des parties du corps des Eupleridae servent de matières premières pour la fabrication de potion dans la médecine traditionnelle ainsi que d’objets fétiche et talisman. Dans l’extrême sud de la queue de Galidia *elegans* sert de talisman appelée *Kelilotsike* ou *Volombotsira*. Une autre pratique quasi-identique à celle-ci est visible dans la partie nord dont les chauffeurs de taxi-brousse accroche des queues séchées de Galidia ou Viverricula sur le rétroviseur intérieur des véhicules, afin d’éviter les exigences des agents de la route, en cas de non respect du code de la circulation, ainsi que du cahier des charges. Dans le Nord-est, l’huile de *Cryptoprocta* sert à fabriquer un remède contre les douleurs de l’oreille.

Conservation à base de sensibilisation

La conservation et protection des carnivora à Madagascar se concentre surtout sur la sensibilisation de la population autochtone avec des affiches mentionnant une faible risque d’implication de ces animaux dans l’attaque des fermes d’élevage, ainsi que par l’importance de la fabrication de poulaillers résistants aux attaques probables de prédateurs.

C’est également une campagne d’information sur l’importance du rôle écologique joué par ces soi-disant petits méchants de la forêt. Les carnivora interviennent notamment dans la limitation des populations d’autres espèces qui constituent leur alimentation. Si le *Cryptoprocta* excelle dans la chasse aux lézards et rongeurs, les Euplerides sont de grands destructeurs d’invertébrés à corps mou notamment de limaces, d’insectes ainsi que des petits reptiles et amphibiens. Une autre espèce, l’agissant de la *Fossa fossana*, excelle dans la pêche en s’attaquant à des animaux aquatiques composés d’insectes, et amphibiens.

Valohery Dominique

The production of the first three books in the series was financed by a grant from the Critical Ecosystem Partnership Fund. A grant has been recently received by the Ellis Goodman Family Foundation [No relationship to Steve Goodman, just a coincidence with the family name] for an additional five guides in the series over the next few years, which also subsidized the 2012 book on Carnivora of Madagascar. Upcoming translated titles include:

1. The amphibians of the dry forests of Madagascar – by Franco Andreone, Daniel Randrianaina, and Achille Raselimanana, which is anticipated to be printed in June or July 2013.
2. The extinct Holocene animals and ecosystems of Madagascar – by Steven M. Goodman and William L. Jungers
3. The amphibians of northeastern Madagascar – by Franco Andreone and Achille P. Raselimanana
4. The amphibians of southeastern Madagascar – by Franco Andreone and Achille P. Raselimanana
5. The amphibians of central eastern Madagascar – by Franco Andreone and Achille P. Raselimanana

To date, other than the free diffusion of these books to Malagasy students and scientists, a considerable number of copies have been sold to people coming to the office or through several overseas booksellers. In general, we are pleased with the interest these books have generated.

A NEW DECISIVE PROGRAM – “SCIENCE FOR THE PEOPLE”

The Association Vahatra is keenly aware that the exclusive approach of advancing aspects of science for a limited portion of Malagasy society, specifically national graduate students, is important, but a large and critical portion of Malagasy society is left out of such programs. A primordial aspect for the future of Madagascar and its biodiversity is to translate lessons learned by scientists to the needs and views of people living in the countryside, particularly close to remaining forested areas. With these different points in mind, a project entitled “Science for the people” and financed with a grant from the John D. and Catherine T. MacArthur Foundation, was launched in 2011. Here are some of the ideas and actions of this project.

An important portion of the Malagasy population, living at least in part via subsistence farming, occur in areas where conservation actions to protect the remaining forested areas are critical. While many of these people have considerable knowledge of the environment and natural cycles associated with their agrarian lifestyle, as well as a clear stake in the impact of forest burning and clearing in their livelihoods, they lack access to new information derived from different scientific fields that might have an important bearing on future strategies. We believe that introducing concepts of modern conservation biology, management, and climatic change, explaining the importance of the local forest biota in a national and international sense, and bolstering aspects of ecotourism, can serve a critical role in providing new perspectives and tools for future management actions for these populations.

The key for this to unfold in the correct manner is the type of communication tools employed. Specifically those that will provide rural populations with needed insight to help them advance towards the mitigation of certain impending ecological problems. Hence, to create a synergy between indigenous knowledge and science, a team of Malagasy



“biodiversity educators”, travel to rural villages to conduct biodiversity education programs.

Using a traditional Malagasy system of public forums, the “biodiversity educators” travel to about 20 villages per year within a given region of the island to transfer different types of scientific and ecological information to local populations using a variety of media (talks, discussions, films, posters, tee shirts, etc.). These forums would provide a greater understanding of what scientific knowledge can offer in ameliorating their lives. Further, in villages with primary schools, considerable emphasis is placed on presenting clear and informative messages and lessons to school kids, who are the future of the nation.

An evaluation mission of the project was carried-out by Voahangy and Achille at two of the targeted villages. The principal intent was to assess the perception of the program by local people. A very simple approach was adopted – the “Science for the people” team pursued their planned program and Voahangy and Achille attended as participants to evaluate if such meetings are effective in raising public interests. They do not intervene, just observed, to avoid influencing the behavior of the local participants. They observed that in the two different villages they attended meetings, a remarkable level of participation of people, comprised of different age groups representing three different generations of certain families, actively contributed to discussions. One student from a local public primary school even wrote and read a poem, inciting people to protect their unique natural heritage and inviting them to learn more about the biodiversity. Furthermore, local authorities, as well as members of the local communities, helped facilitate the “Science for the people” team activities and joined them during visits to the local forest.

OTHER CAPACITY BUILDING PROGRAMS FOR MALAGASY STUDENTS AND RESEARCHERS

Lecture series

A lecture series has been organized at the Vahatra office to allow dissemination of new research, monitoring, and conservation themes concerning Madagascar. Another intent for the series is the exchange of ideas, both in a formal setting in the context of the lectures, and in

a more informal setting of a cocktail after each lecture. To meet this goal individuals and organizations from the private, academic, and governmental sectors are invited to participate. A relatively large room at the Vahatra office, which normally serves as the students’ working space, is easily converted into a lecture hall, with folding chairs rented from a nearby restaurant. An attempt has been made to hold these lectures every 2-3 months, but with the political problems since the first portion of 2009, this was complicated to arrange. Lectures are attended by 40-80 people and have been enthusiastically received by the Malagasy scientific and conservation communities.

In 2012, three conferences were presented:

1. Génétique des populations, Conservation génétiques et application by Lounès Chikhi, Chargé de Recherche au Centre National de la Recherche Scientifique à l’Université Paul Sabatier de Toulouse (June 2012).
2. L’impact des espèces exotiques envahissantes sur la biodiversité insulaire - Quelles solutions ? by Olivier Langrand, Director of Global Affairs, Island Conservation, USA (July 2012).
3. Fenêtres sur les animaux extraordinaires et les écosystèmes récemment disparus de Madagascar by Steven M. Goodman, Association Vahatra and Field Museum (December 2012).



Field Schools

Each year Vahatra holds at least one field school each year for aspiring young Malagasy graduate students to help advance their knowledge and interest in field biology. These field schools are also often held with students and professors from other countries to help build links, a greater international context for science and a broader sense of ecosystems and different organisms that occur in them. In 2012, for the first time in memory, no field school was organized by Vahatra.

In October, Marie Jeanne Raherilalao, Voahangy Soarimalala, and Achille Raselimanana had planned to organize a field school within the Tsimanampetsotsa National Park and in the context of the collaborative project known as “Sustainable Land Management on the Mahafaly Plateau” (SULAMA) and in collaboration with The University of Hamburg and the Malagasy national university system. Ten students from three universities (Antananarivo, Fianarantsoa, and Toliara) and agents of Madagascar National Parks (MNP) had planned to attend the field course. However, for security reason, specifically a student that had been kidnapped not too far from Tsimanampetsotsa and gangs of bandits raiding cars on the road towards Tsimanampetsotsa, it was necessary to postpone this field school until 2013.

In March 2012, a field mission was carried out to the forest of Ankazomivady in collaboration with the Institut Pasteur de Madagascar (IPM) and in the context of an emerging diseases project of the Centre de Recherche et de Veille sur les maladies émergentes dans l’Océan Indien (CRVOI). During this field trip, two students from the Institut des Sciences et Technique de l’Environnement (ISTE), University of Fianarantsoa, intended and benefited from associated with their Professional licence diploma.



CURRENT GRANTS

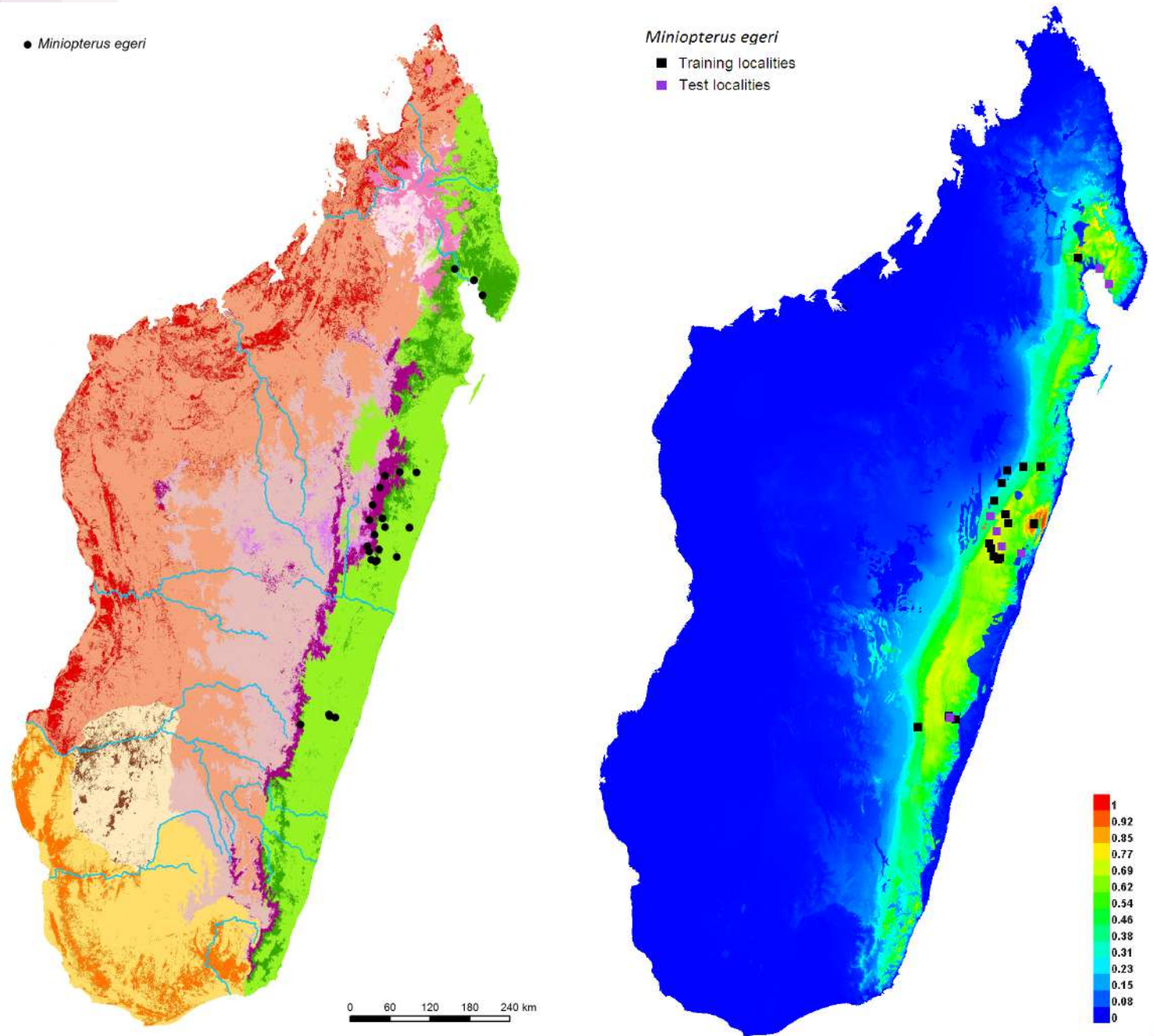
- John D. and Catherine T. MacArthur Foundation - Assessing the impacts of climatic change on high mountain animals and tests of new biogeographic hypotheses to understand biotic diversity on Madagascar, 2009-2012, extended until 2013.
- Volkswagen Foundation -- The advancement of Malagasy conservation biologists, 2007-2012. Project terminated in late December.
- John D. and Catherine T. MacArthur Foundation -- The dissemination of scientific information to the Malagasy people, 2010-2013.
- Vontobel Foundation -- Constitution of a team of Malagasy biologists trained in flora and fauna studies for conservation planning, 2011-2013.
- Ellis Goodman Family Foundation – Financing for the “Guides sur la diversité biologique de Madagascar” series, 2012-2015.

OTHER PROJECTS

An atlas to selected endemic land vertebrates

After many years of fieldwork and museum studies on different types of land vertebrates occurring on Madagascar, and the compilation of a large database, Association Vahatra is approaching completion of a massive project. A large format bilingual (English and French) book to be entitled, “*Atlas to selected land vertebrates of Madagascar*” will be published in 2014. The atlas will cover selected groups of reptiles (Achille Raselimanana), small mammals (Steve Goodman, Voahangy Soarimalala and collaborators), birds (Marie Jeanne Raherilalao and Steve Goodman), and bats and carnivorans (Steve Goodman). Based on the skills of Herivololona Mbola Rakotondratsimba, who has been engaged as a consultant in the management of the database and production of maps, the known distribution of a large assortment of animals will be illustrate and ecological models presented. For each species mapped, details will be presented on their distribution, ecology, and systematics. This project is financed by a grant from the John D. and Catherine T. MacArthur Foundation. When the project is completed, a

large database concerning these different animal groups will be made available to the scientific community in the context of a collaboration between Vahatra and a national project known as ReBioMa.



The extinct Holocene animals and ecosystems of Madagascar

In collaboration with Bill Jungers at The State University of New York, Stony Brook, Steve Goodman is in the process of finishing a large synthesis written for a general audience on Holocene extinctions on Madagascar. The book will be titled, *"Windows into the extraordinary recent land animals and ecosystems of Madagascar"* and published by The University of Chicago Press. The text is centered around 20 extraordinary plates created by Velizar Simeonovski, reconstructing different sites on Madagascar, specifically the animals and habitats that existing based on data from fossils. In each case, the importance of natural climatic change versus human-induced change is assessed, in the attempt to answer the question as to what happened? The ms. should be submitted in early 2013 and the book should appear late that same year or early in 2014. A concise French version will be published in the Vahatra guide series.



ACTIVE COLLABORATIONS OF VAHATRA

In order for Vahatra to develop new directions for the Malagasy and regional scientific communities, a number of collaborative endeavors have been advanced. Below is a listing of some of these collaborative projects:

- The University of Antananarivo, Department of Animal Biology – Vahatra closely collaborates with this department in different manners including training and mentoring of students, seminars and classes, field schools, etc. All of the scientific founding members of Vahatra have professional links to this department. The ability for the association to advance on numerous fronts particularly associated with student capacity building and field research is directly based on this collaboration.
- Centre de Recherche et de Veille sur les maladies émergentes dans l'Océan Indien (CRVOI), La Réunion, France – Vahatra is a member of a large-scale project to develop a catalog of diseases occurring amongst wild land vertebrates of the western Indian Ocean. CRVOI through a grant generously supported by FEDER Réunion, Programme Opérationnel de Coopération Territoriale (2007-2013), "Faune Sauvage-Océan Indien" (project number 31189) is able to subsidize considerable portions of different field projects. Further, researchers and students from Vahatra have taken part in several field trips on Madagascar, nearby islands and continental Africa to obtain samples. The laboratory analyses of this project are advancing rapidly and a number of very interesting results are becoming available and published. Several different viruses and other diseases exist in the region that may have important impact on human health. Several papers have been submitted or are being prepared to present these results and their implications. A Malagasy student that did his Ph.D. based out of Vahatra, Beza Ramasindrazana, has a post-doc post for 2013 at CRVOI. To further strengthen these ties, Steve Goodman serves as a member of the scientific council of CRVOI.
- Field Museum of Natural History (FMNH), Chicago, Illinois – for more than 25 years, the Field Museum has been a critical collaborator for our pedagogic and scientific projects on

Madagascar. This has been on many fronts, ranging from assistance with the management of grants, fund-raising, overseas study visits of Malagasy scholars and students, and in many ways being the “big brother” institution of Association Vahatra. Steve Goodman is employed by the Field Museum and holds the post of “Field Biologist” on their staff.

- Institut de Recherche et Développement (IRD), Montpellier, France – a project with this organization terminated in 2011 on the role of wild small mammals as potential reservoirs for Rift Valley Fever in a zone of Madagascar where this disease has been a serious problem amongst cattle and humans. One Malagasy student working out of Vahatra, Tony Andrianaisoa, has conducted his Ph.D. research in the context of this project.
- Institut Pasteur, Antananarivo and Paris – part of the consortiums associated with the CRVOI project mentioned above, as well as the Rift Valley Fever project, include the Institut Pasteur. Students and researchers from Vahatra have conducted a number of joint field missions with researchers and technicians from the Institut Pasteur de Madagascar (IPM). Further, a number of scientific papers have been published or soon will be submitted in collaboration with IPM and CRVOI. This collaboration has been recently expanded with a new project directed by Sandra Telfer and concerns diseases of endemic and introduced rodents. This project is financed by a



grant from the Wellcome Trust to The University of Aberdeen and the IPM. A Ph.D. student working out of Vahatra will conduct his research on rodent ecology in the context of this project.

- University of Kwa-Zulu Natal, Durban, South Africa – part of a southern hemisphere network-collaboration project. Students and professors from University of Kwa-Zulu Natal, Durban, work in collaboration with Vahatra students and researchers in Madagascar, taking part once per year in field schools held in forest-settings in Madagascar. These field schools have been financed by a grant from the Volkswagen Foundation, which ended some months ago. Over the past few years, at least six South African students have conducted a portion of their graduate students on Malagasy animals, in collaboration with Malagasy counterparts at Vahatra. Further, Malagasy students and professors have attended specially arranged courses in Durban labs concerning molecular genetic research and ecological modeling. Finally, one of the Durban counterparts has recently moved to the University of Venda, in northern South Africa, and several students from that university have attended field schools in Madagascar.
- The University of Johannesburg, South Africa – Vahatra has a collaboration with a genetics laboratory at this university associated with a project on climatic change impacting animal distributions in the high mountains of Madagascar. The salary of a technician and lab costs are paid for by a grant to the Field Museum/Vahatra from the MacArthur Foundation. The collaborator in this project Bettine Jansen van Vuuren was formerly at Stellenbosch University and moved in the latter portion of 2011 to Johannesburg.
- The University of Melbourne, Australia – we have an ongoing collaboration with Dr. Belinda Appleton in the Genetics Department on molecular studies associated with a group of Malagasy bats.



- Biodiversity Conservation Madagascar (BCM), Antananarivo and Mauritius – Vahatra has a collaborative project with this organization to conduct research at two different forest blocks they manage and to help advance research and conservation activities.
- Jardin botanique de la Ville de Genève, Switzerland – A joint grant has recently been received from a Swiss private bank foundation under the title, “Constitution of a team of Malagasy biologists trained in flora and fauna studies for conservation planning.” The project involves joint field studies to develop research programs on the interactions between local fauna and flora, with the view of developing aspects of ecosystem functioning. The Geneva team has installed in the new annex building, to create closer ties and working relations with Vahatra. In late 2011, a joint field trip was conducted to the Beanka Forest, in the western portion of Madagascar.



COLLECTION SPACE, UNIVERSITY OF ANTANANARIVO

One of the permanent staff members of Vahatra, Dr. Voahangy Soarimalala, also is the principal curator of the “Collection Space” in the Animal Biology Department at the University of Antananarivo. This research collection is managed at the standards of an international natural history museum. During 2012, Vahatra scientists played a



very active role in the deposition, cataloging, identification, and verification of mammal, bird, and reptile specimens within the collection in the context of the atlas project mentioned above.



NEW SPECIES OF ANIMALS DESCRIBED BY VAHATRA SCIENTISTS AND STUDENTS IN 2012

One of the direct results of the biological inventories conducted by Vahatra and associated voucher specimens collected, is the discovery of animal species previously unknown to science. Based on follow-up morphological and genetic research conducted on these specimens, several new species to science have been described in 2012:

1. *Neoromicia robertsi* Goodman, Taylor, Ratrimomanarivo & Hofer. *Zootaxa*, 3250: 1-25. This species is currently only known from two localities in the Central Highlands. Current PhD, thesis work by Fabienne Rakotondramanana is focused in part on this genus.
2. *Paraemballonura*, new genus Goodman, Puechmaille, Friedli-Weyeneth, Gerlach, Ruedi, Schoeman, Stanley & Teeling. *Journal of Mammalogy*, 93: 1440-1455. On the basis of molecular genetic data, the Malagasy members of the genus *Emballonura* fall into a different group and now transferred to a new genus *Paraemballonura*.
3. *Coleura kibomalandy* Goodman, Puechmaille, Friedli-Weyeneth, Gerlach, Ruedi, Schoeman, Stanley & Teeling. *Journal of Mammalogy*, 93: 1440-1455. This new species is known from two localities on Madagascar and at these sites, it is not particularly rare.



Adult male *Coleura kibomalandy* © Scott Cardiff

ACTIVITIES OF VAHATRA PERMANENT MEMBERS DURING 2012

January

As members of the Board Authority for the REBIOMA database (<http://www.rebioma.net/>), Achille Raselimanana, Marie Jeanne Raherilalao and Voahangy Soarimalala attended a workshop held in Antananarivo. The focus concerned reviewing the web portal associated with the database. Marie Jeanne revised bird lists for certain localities, Voahangy updated the scientific names of small mammals in the database, and Achille supervised corrections and updates to the national reptile and amphibian list.

In collaboration with Sushma Reddy and Nicholas Block from Field Museum of Natural History of Chicago, they also wrote a grant application to the National Science Foundation (NSF) to fund a project on the genetic diversification of two endemic bird families of Madagascar.

Voahangy helped to develop two “Professional licence” (a sort of low Master’s in the French University System) projects for students at the University of Fianarantsoa. She continued to catalogue and curate the small mammal collection at the Animal Biology Department, University of Antananarivo for the Vahatra atlas and database projects.

The preparation of courses and examinations at the University of Antananarivo, as well as for the University of Fianarantsoa, occupied a considerable amount of time for Marie Jeanne, Voahangy, and Achille during this month.

In the latter portion of the month, Steve was a jury member for two theses in France, one at the University of Rennes and the other at the University of Paris.

February

Marie Jeanne and Voahangy were actively involved in the preparation of the field missions to Lakato and Ankazomivady forests with the Institut Pasteur de Madagascar (IPM). This emerging disease project is in collaboration with the Centre de Recherche et de Veille sur la Maladie Emergente dans l’Océan Indien (CRVOI).

Marie Jeanne, Voahangy, Steve and Achille prepared the report on the results of the biological inventories carried-out in Salary Bay, in the southern Madagascar, in December 2011. This project conducted in the context of collaboration between Association Vahatra and The Programme Germano-Malgache pour l’Environnement (PGM-E).

Voahangy continued to revise scientific names of non-primate mammal species for the REBIOMA database. She also gave comments on the “mémoires” of three University of Fianarantsoa students at the final stage of writing. During this period, Achille, as a member of committee of a Vahatra DEA student, commented on the document before its presentation to the Faculty of Science. He also was in charge of the evaluation of one Thesis, as an internal referee.

In the first half of February, Steve conducted fieldwork with Beza Ramasindrazana and colleagues from CRVOI in central and southwestern Madagascar associated with a project of diseases of bats. The mission was cut slightly short by a cyclone that struck the island.

March

Steve and Marie Jeanne worked extensively on the final text for the Carnivora guide and Malalarisoa Razafimpahanana and Steve worked together on the book design, illustrations, and format.

Marie Jeanne and Voahangy carried out field research with IPM and CRVOI in Lakato and Ankazomivady forests. This is also an opportunity to train two students from Institut des Sciences et Technique de l’Environnement (ISTE), Fianarantsoa, on sampling technique and appropriate methods for biological assessment. Achille was involved in this fieldwork conducting research on the reptile and amphibian fauna.

Steve gave a broad overview introductory talk to arriving Peace Corps volunteers on Madagascar. He has done this annual event for nearly a decade. Thereafter, he conducted fieldwork in the central west with Beza Ramasindrazana and colleagues from CRVOI on bat diseases.

Marie Jeanne worked on the Malagasy bird database associated with the atlas project, and Voahangy did the same for small mammal specimens in the collection of the Department of Animal Biology, University of Antananarivo. Achille spent the last week of March commenting on the

DEA “mémoires” of two of his students approaching the final stages before the defense.

In the second half of March, Steve conducted fieldwork with Beza Ramasindrazana and colleagues from CRVOI in southwestern Madagascar associated with a project on bat diseases.

April

With three students affiliated with Vahatra, Marie Jeanne, and Voahangy attended the environmental fair organized by the American Embassy in Antananarivo to present books published in the guide series of the association.

Marie Jeanne spent a portion of the month cataloging bird specimens at the collection of the Animal Biology Department, University of Antananarivo, and working on the Malagasy bird database project. She reviewed articles submitted for publication in *Malagasy Nature*. As a supervisor of Seheny Ramanakasi, a DEA student affiliated with Vahatra, she helped with data analysis and commented on a “mémoire” draft.

Voahangy helped to develop a “Professional licence” project in collaboration with Madagascar Biodiversity Partnership and Queen’s University in Belfast. She closely followed the advancement of her three students for their “Professional licence” degree at the University of Fianarantsoa. She served as a jury member for two other students. She spent a part of her time cataloging small mammal specimens in the collection of the Animal Biology Department, University of Antananarivo. Finally, Voahangy reviewed an article on small mammals submitted to the journal *Madagascar Conservation & Development*.

This month, Achille was busy with the compilation of the book on chameleons of the world in collaboration with John Measey, the editor of *African Journal of Herpetology*, and Kristal Tolley, from South African National Biodiversity Institute. He also helped with the data analysis of one Vahatra student working on terrestrial vertebrate communities in the forest-savannah contact zone and another studying the ecological preference and population structure of the giant nocturnal gecko *Uroplatus giganteus*.

May

Radio des Jeunes radio station interviewed the scientific members of Vahatra about the history of the association, research activities, and the natural sciences on the island.

In collaboration with Steve, Marie Jeanne was involved in the review and assessment of manuscripts submitted to *Malagasy Nature*.

Marie Jeanne and Voahangy furnished technical and scientific assistance to the staff of the “Sciences for the people” project. Furthermore, Marie Jeanne supervised the final stages of the DEA of one of her students, Haingonirina Eric Rakotomalala. The “mémoire” was entitled: “Etude de la communauté d’Anatidae sauvages du Lac Alaotra à Madagascar et risques épidémiologiques associés”. Voahangy provided comments on the penultimate versions of “mémoires” of two students she is working with at The University of Fianarantsoa.

Achille, with people from different NGOs and institutions, participated in the preparation of the Malagasy delegation’s intervention for the Convention on Biological Diversity meeting, held October 2012 in India.

He was in charge of the compilation of conservation strategies developed to date by Madagascar to protect threatened species of amphibians, reptiles, and birds.

For much of May, Steve led a tour around Madagascar of naturalists associated with the Australian National Museum.

At the half of this month, the Carnivora book was presented to scientific community. The launching was covered in the Malagasy media.



L'Association Vahatra (« racine » en français), dont les objectifs principaux sont axés sur la recherche et la formation des étudiants a produit une série de guides qui couvrent plusieurs sujets concernant la biodiversité de Madagascar. Ce livre intitulé « Les Carnivora de Madagascar » écrit par Mr Steven M. Goodman, membre fondateur et conseiller scientifique de l'association, constitue le 4^{ème} de la série. Une présentation du livre et des « carnivora » en question a été effectuée au siège de l'association Vahatra sis à Antsohiatona (près de l'Université de Tananarive) le vendredi 08 juin 2012.

Steven Goodman, un zoologiste américain en contact plus sur la faune de Madagascar qu'un Malgache! Effectivement, il a passé 27 ans à sillonner dans les forêts de la Grande Ile, en quête de nouvelles espèces à étudier, à baptiser et à suivre de près. Ancien membre de la WWF à Madagascar, il a décidé de fonder avec Mr Achille Raselimanana son collaborateur l'Association Vahatra. Il a sorti en 1990 un livre de 7500 pages (manuscrites) et 1700 pages (imprimées) intitulé « Les Oiseaux du Sud Ouest de Madagascar » en version anglaise et française. « Paysages naturels et biodiversités », un livre de 630 pages est sorti en 2008. D'ici la fin de l'année, il sortira encore 2 livres sur lesquels il travaille en ce moment.

Le livre « Les Carnivora de Madagascar » composé de 158 pages en couleur et illustrées décrit l'histoire naturelle des espèces carnivores de la Grande Ile, notamment 13 espèces de Carnivora sont présentes dans le pays. Toutes les espèces endémiques ne vivent que dans les forêts intactes dont la plupart sont parmi la liste rouge des espèces menacées de l'Union Internationale pour la Conservation de la Nature (en 2011).

A travers ce livre, les Malgaches pourront connaître davantage leur richesse inestimable en faune et la préserver pour les générations futures.

Annie R.

<http://agencepresse-oi.com/component/content/article/1119-a-la-une.html>

June

Marie Jeanne supervised the advancement of her student making the final touches to a DEA “mémoire”, which was defended in mid-June. She also participated as a jury member for another DEA and reviewed a third DEA of a student she is supervising, Andry Nantenaina Randriamady. Achille was also involved in the jury of this student, and participated as a jury member for two other DEAs from the Department of Animal Biology, The University of Antananarivo.

Marie Jeanne acted as a reviewer for a paper submitted to the journal *Madagascar Conservation Development*.

The formal presentation of the book “*Les Carnivora de Madagascar*” was made at the Vahatra office, which included a short lecture by Steve.

Voahangy Soarimalala was actively involved in the preparation of a research proposal associated with a project on small mammal diseases financed by Wellcome Trust and in collaboration with the IPM and The University of Aberdeen. She did a reconnaissance mission in the context of this project. She provided comments on the “Professional licence mémoire” of students reaching the final stages of work before the formal presentation.

Marie Jeanne, Voahangy, and Achille attended a two-day workshop with the other Board Authority Review members associated with the REBIOMA database project. The sessions were devoted to the mechanism to facilitate access through the data portals for reviewers to access and make comments on the database.



Marie Jeanne and Achille attended the inauguration of the Namanabe Hall of Valbio Research Center just outside of the Ranomafana National Park. They represented, respectively, the Animal Biology Department,

Faculty of Sciences, University of Antananarivo and the Association Vahatra.

A Vahatra student, Beza Ramasindrazana, presented his thesis in early June and Steve was amongst the jury members. Even before the presentation, he had already been offered a post-doc at CRVOI on La Réunion to study blood parasites of bats.



In the middle of the month, Steve left for his annual visit to the Field Museum in Chicago. This is the period he commenced to seriously research and write the manuscript for the book, “*Windows into the extraordinary recent land animals and ecosystems of Madagascar*”.

July

In the first portion of the month, Nick Block, an ornithologist that worked with Mary Jeanne and Steve on Madagascar, presented his thesis at The University of Chicago. Steve was a jury member.

Marie Jeanne and Voahangy organized a bookstand during the IUCN primate specialist group workshop held at Carlton Hotel in Antananarivo to present different Vahatra publications on Malagasy biological diversity.



In collaboration with Vola Fanantenana Raharinirina, a REBIOMA consultant who helped with vertebrate data entry, Marie Jeanne continued to work on the bird database.

Voahangy conducted a field visit associated with her supervision of a “Professional licence” project at Kianjavato. She spent an important portion of the month cataloging small mammal specimens in the collection of the Animal Biology Department, University of Antananarivo.

Achille, in collaboration with Franco Andreone, worked on a draft of the next guide in the Vahatra series concerning the amphibians of the dry forests of Madagascar.

August

Marie Jeanne continued to work on the bird database and reviewed and edited articles submitted to *Malagasy Nature*.

In the first portion of the month, Voahangy was much occupied with course work at The University of Fianarantsoa. She conducted a field visit associated with her supervision of a “Professional licence” project in the Ambatovy mine site. She also reviewed an article submitted to *Malagasy Nature*.

This month was devoted to prepare the start of the new academic year at The University of Antananarivo that involved a number of meetings in the Department of Animal Biology, which were attended by Marie Jeanne and Achille. They are also served on the jury of two DEA presentations. Moreover, Achille was designated to be the internal referee for a thesis related to population genetics of a lemur species from northwestern Madagascar. For technical reason, the defense date was reported until 2013.

In the context of the Vahatra Vontobel project, Achille and members of the associated botanical team conducted a reconnaissance mission in central western Madagascar, in the context to prepare an upcoming biological assessment of the local forest.

Steve returned to Madagascar at the end of the month from his trip to the USA.

September

Steve conducted fieldwork with Beza Ramasindrazana and colleagues from CRVOI in the region of Mahajanga and Antsiranana on bats and the different diseases and parasites they carry. This was part of Beza’s post-doc research.

Marie Jeanne pursued work on the bird database and reviewed and edited articles for *Malagasy Nature*. She continued to supervise the advancement of her student completing a DEA “mémoire”, which was presented in mid-September. With Achille, she participated in the review commission and jury for one DEA “mémoire”. Achille was also involved as a jury member for two other DEA “memoires”.

Voahangy continue cataloging small mammal specimens in the collection of the Animal Biology Department, University of Antananarivo. She also furnished regularly technical and scientific assistance to the “Science for the people” team. She helped to develop a “Professional licence” project at the University of Fianarantsoa, where during the month she presented courses.

Voahangy also helped to prepare the logistics for a field school planned for October in the Tsimanampetsotsa National Park associated with the SULAMA (Sustainable Land Management on the Mahafaly Plateau) project. The field school had to be canceled associated with security problems in this area.

Voahangy and Achille were invited to join the national steering committee for the fight against rabies. They attended the first meeting of the committee held in Antananarivo.

In the end of the month, Steve traveled to Paris to be a jury member for a thesis presented at The University of Paris.

October

After an extended strike since the first portion of the year, classes at the University of Antananarivo commenced at the beginning of this month. Marie Jeanne and Achille started giving courses and spent most of their time at the university.

In the first portion of the month, Steve traveled to the USA for a quick trip to make a presentation at the Interlochen Arts Academy about the

arts and science. Towards the end of the month, he was on La Réunion to make another presentation for the Run-Emerge program of CRVOI and The University of La Réunion.

Marie Jeanne attended the 13th Pan-African Ornithological Congress (PAOC 13) held in Arusha, Tanzania. She made an oral presentation co-authored with Steve on the importance of forest corridors in the conservation of Malagasy forest-dwelling birds. Further, she was elected as a member of the PAOC 14 organizational committee.



Voahangy and Achille undertook a field evaluation for “Science for the people” project in northern Madagascar. This was an opportunity for them to have insight into the success of the project with respect to the local communities’ interest.

Two students defended their “Professional licence” degrees at the University of Fianarantsoa, and Voahangy was in charge of the final details associated with these projects. She continued cataloging small mammal specimens in the collection of the Animal Biology Department, University of Antananarivo.

Steve was an instructor in the Tropical Biology Association course held in the Kirindy Forest and then with Beza Ramasindrazana and a colleague from CRVOI continued to the north (Bemaraha) to collect samples of bats for Beza’s post-doc on diseases carried by bats.

November

In collaboration with Steve, Marie Jeanne edited volume 6 of *Malagasy Nature*. She also pursued work on the bird database and her teaching activities at the university. One of her student working on the breeding of a critically endangered species frog, *Mantella aurantiaca*, received support from her associated with data analysis and the completion of this “mémoire”.

Voahangy Soarimalala helped to develop two “Professional licence” projects at the University of Fianarantsoa on small mammals in the Ranomafana National Park. She also took part in a field school in the Isalo National Park for students from The University of Fianarantsoa, and pursued her teaching responsibilities. In collaboration with her

colleagues at the University of Fianarantsoa, she participated in the preparation of a grant application to the Norwegian NORHED program. On her return to Antananarivo, she continued working on the small mammal collection with Steve in the Animal Biology Department, University of Antananarivo.

Achille was solicited by the Institut Pasteur de Madagascar to join their Animal Ethics Committee. He attended the first meeting, to evaluate the treatment of animals by researchers. As a member of the Ambatovy project Scientific Committee Consul, he attended the fourth annual meeting of this committee.

December

Marie Jeanne worked intensively on cataloging and verifying identification of bird specimens in the collection of the Animal Biology Department, University of Antananarivo. She continued her teaching activities at the university.

Marie Jeanne and Steve completed the final editing and Malalarisoa Razafimpahanana the typesetting of volume 6 of *Malagasy Nature*. It was posted on the Vahatra website towards the end of the month with free downloading of published articles.

During December, in collaboration with the Animal Biology Department, Marie Jeanne and Achille were intensively involved in the revision and editing of documents associated with the “Licence Master Doctorat” (LMD) program to be launched in the near future at the University of Antananarivo. Marie Jeanne also served as a jury member of a DEA student affiliated with the SULAMA project.

Voahangy Soarimalala helped to develop a “Professional licence” project for a student from the University of Fianarantsoa that will work in Bemanevika-Bealanana area. She commented on five different “Professional Licence mémoires” in the final stages of preparation.

Voahangy and Steve continued to verify intensively all the small mammals specimens in the collection of the Animal Biology Department, University of Antananarivo.

Achille in collaboration with different co-authors, made good progress in the compilation of the different parts of the book on the amphibians of

the dry forests of Madagascar. This will published in 2013 in the Vahatra guide series. During this month, Achille was also a jury member for a DEA presented at the University of Antananarivo.

SCIENTIFIC OUTPUTS OF VAHATRA DURING 2012

Publications from 2012, including submitted manuscripts

Names in **bold** are scientific members of Vahatra and those in *italics* are current or past student members.

- Andriamandimby, S. F., M. Ratsitorahina, R. Ramiandrasoa, J.-M. Reynes, J. H. Rasambainarivo, L. Dacheux, A. Lepelletier, **S. M. Goodman**, J.-M. Héraud & H. Bourhy. Submitted. Surveillance and control of rabies in La Réunion, Mayotte, and Madagascar. *Veterinary Research*.
- Cardiff, S. G., *F. H. Ratrimomanarivo* & **S. M. Goodman**. The effect of tourist visits on the behavior of *Rousettus madagascariensis* (Chiroptera: Pteropodidae) in the caves of Ankarana, northern Madagascar. *Acta Chiropterologica*, 14: 479-490.
- Chan, L. M., D. Choi, **A. P. Raselimanana**, *H. A. Rakotondravony* & A. D. Yoder. Defining spatial and temporal patterns of phylogeographic structure in Madagascar's iguanid lizards (genus *Oplurus*). *Molecular Ecology*, 21, 3839-3851.
- Dammhahn, M. & **S. M. Goodman**. Submitted. Trophic niche differentiation and microhabitat utilization revealed by stable isotope analyses in a Malagasy dry forest bat community. *Biotropica*.
- Dammhahn, M., **V. Soarimalala** & **S. M. Goodman**. Trophic niche differentiation and microhabitat utilization in a species-rich montane forest small mammal community of eastern Madagascar. *Biotropica*, 45: 111-118.
- Fuchs, J., J. L. Parra, **S. M. Goodman**, **M. J. Raherilalao**, J. VanDerWal & R. C. K. Bowie. In press. Extending species distribution models to the past 120,000 years corroborates the lack of phylogeographic structure in the crested drongo (*Dicrurus forficatus*) from Madagascar. *Biological Journal of the Linnean Society*.
- Godfrey, L. R., K. E. Samonds, J. R. Ali, **S. M. Goodman**, M. Vences, M. B. Sutherland, M. T. Irwin & D. W. Krause. Reconstructing Madagascar's vertebrate colonization history: a journey through time. *American Journal of Physical Anthropology*, 147: 152.
- Goodman, S. M.** *Les Carnivora de Madagascar*. Association Vahatra, Antananarivo.
- Goodman, S. M.** & W. L. Jungers. In press. *Windows into the extraordinary recent land animals and ecosystems of Madagascar*. The University of Chicago Press, Chicago.

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Short communication

Identification of novel paramyxoviruses in insectivorous bats of the Southwest Indian Ocean

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ABSTRACT

Bats are reservoirs for many emerging zoonotic viruses. In this study, we screened 197 animals from 15 different bat species of the Southwest Indian Ocean for paramyxovirus infection and identified paramyxoviruses in five insectivorous bat-species from the Union of the Comoros (3/66), Mauritius (1/55) and Madagascar (4/76). Viral isolation was possible via cell culture and phylogenetic analysis revealed these viruses clustered in a Morbillivirus-related lineage, with relatively high nucleotide sequence similarity to other recently discovered insectivorous-bat paramyxoviruses but distinct from those known to circulate in frugivorous bats.

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Paramyxoviruses have been described in a large diversity of mammalian hosts. Recent studies have suggested that bats may represent an important and unique reservoir for several emerging viruses (Wang et al., 2011), some of which have been incriminated in human epidemics and mortality (Field, 2009; Wong et al., 2007). For instance, fruit bat-species (Pteropodidae) may represent the natural reservoir for Hendra and Nipah viruses (Field et al., 2011; Luby et al., 2009). Such viruses are recognized as a threat to human and veterinary health, and recent studies have shown that bats and rodents worldwide host a broad spectrum of paramyxoviruses (Drexler et al., 2012; Kurth et al., 2012) includ-

ing Henipah-related, Respiratory and Morbillivirus-related viruses. Fifty-seven species of bat, including 50 endemic species, have been described in the Southwestern Indian Ocean (SWIO) region, and earlier studies have detected antibodies to paramyxoviruses in Pteropodidae of the region (lehle et al., 2007). Here, we investigated the circulation of paramyxoviruses in 15 bat-species in the islands of the SWIO, which are part of hotspots of biodiversity neighboring the countries of East Africa, known for several emerging pathogens (Jones et al., 2008; Myers et al., 2000; Tortosa et al., 2012).

As part of a program aiming to establish an inventory of infectious agents circulating in wild fauna of the SWIO area, bats were definitively captured at four locations: Anjouan and Grande Comore Islands (Union of Comoros), Mauritius and Madagascar using mist nets or harp traps. The appropriate national research permits were obtained for each location. Individual bats were identified by external and cranio-dental characteristics based on voucher specimens, and details of age/sex were recorded. Tissue samples were collected within 30 min of each individual being dispatched, frozen in liquid nitrogen and stored at -80 °C until testing.

Abbreviations: SWIO, Southwestern Indian Ocean; RMH, Respiratory/Morbillivirus and Henipavirus; PMV, Paramyxovirinae.

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- Goodman, S. M.**, S. J. Puechmaille, N. Friedli-Weyeneth, J. Gerlach, M. Ruedi, M. C. Schoeman, W. T. Stanley & E. C. Teeling. Phylogeny of the Emballonurini (Emballonuridae) with descriptions of a new genus and species from Madagascar. *Journal of Mammalogy*, 93: 1440-1455.
- Goodman, S. M.**, P. J. Taylor, *F. Ratrimomanarivo* & S. Hoofer. The genus *Neoromicia* (Family Vespertilionidae) on Madagascar, with the description of a new species. *Zootaxa*, 3250: 1-25.
- Goodman, S. M.**, N. Weyeneth, Y. Ibrahim, I. Said & M. Ruedi. De nouvelles données sur les chauve-souris insectivore. *Etudes sur l'archipel des Comores*, eds. M. Charpentier & A. Sidi, pp. 62-67. Naturalistes, Environnement et Patrimoine Mayotte, Mamoudzou.
- Lagadec, E., Y. Gomard, V. Guernier, H. Pascalis, S. Temmam, *B. Ramasindrazana*, **S. M. Goodman**, P. Tortosa & K. Dellagi. Pathogenic *Leptospira* spp. in bats, Madagascar and Union of the Comoros. *Emerging Infectious Diseases*, 18: 1696-1698.
- Lamb, J.M., T. Naidoo, P. J. Taylor, M. Napier, *F. Ratrimomanarivo* & **S. M. Goodman**. Genetically and geographically isolated lineages of a tropical bat (Chiroptera, Molossidae) show demographic stability over the late Pleistocene. *Biological Journal of the Linnean Society*, 106: 18-40.
- Laurence, W. F. and over 200 authors including **S. M. Goodman**. Averting biodiversity collapse in tropical forest protected areas. *Nature*, 489: 290-294.
- Newmark, W. D., W. T. Stanley & **S. M. Goodman**. Submitted. Community dynamics and extinction risk for small mammals in fragmented Afrotropical forests 65 years post-isolation. *Ecography*.
- Olive, M.-M., **S. M. Goodman** & J.-M. Reynes. The role of the wild mammals in the maintenance of Rift Valley Fever Virus. *Journal of Wildlife Diseases*, 48: 241-266.
- Olive, M.-M., N. Razafindralambo, *T. Andrianaivo Barivelo*, J.-T. Rafisandratanisoa, **V. Soarimalala**, **S. M. Goodman**, P. E. Rollin, J.-M. Heraud & J.-M. Reynes. Submitted. No evidence of Rift Valley fever virus circulation among wild terrestrial small mammals in Madagascar. *Emerging Infectious Diseases*.
- Rakotoarisoa, J.-E., **S. M. Goodman** & *M. Raheriarisena*. Evidence for a role of historical factors on the evolution of the endemic rodent *Eliurus carletoni* (Rodentia: Nesomyinae) in an ecological transition zone of northern Madagascar. *Journal of Heredity*.
- Rakotoarisoa, J.-E., *M. Raheriarisena* & **S. M. Goodman**. Late Quaternary climatic vegetational shifts in an ecological transition zone of northern Madagascar: insights from genetic analyses of two endemic rodent species. *Journal of Evolutionary Biology*.
- Ramasindrazana, B.* & **S. M. Goodman**. Bio-écologie des chauves-souris du Parc National de Tsimanampetsotsa. 1. Identification bioacoustique et habitat préférentiel. *Malagasy Nature*, 6: 103-116

A Phylogeographic Study of the Endemic Rodent *Eliurus carletoni* (Rodentia: Nesomyinae) in an Ecological Transition Zone of Northern Madagascar

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Abstract

We conducted a mitochondrial phylogeographic study of the endemic dry forest rodent *Eliurus carletoni* (Rodentia: Nesomyinae) in an ecological transition zone of northern Madagascar (Loky-Manambato) and 2 surrounding regions (Ankarana and Analamerana). The main goal was to assess the evolutionary consequences on this taxon of the complex landscape features and Quaternary ecological vicissitudes. Three haplogroups were identified from the 215 specimens obtained from 15 populations. High levels of genetic diversity and significant genetic differentiation among populations were observed. The different geographical subdivisions of the study area by regions, by river catchment zones, and the physical distance between populations are not correlated with genetic patterns. In contrast, population structure is mostly explained by the geographic distribution of the samples among existing forest blocks. *E. carletoni* experienced a genetic bottleneck between 18 750 and 7500 years BP, which correlates with periods when moister climates existed on the island. Overall, our data suggest that the complex genetic patterns of *E. carletoni* can be explained by Quaternary climatic vicissitudes that resulted in habitat fluctuations between dry and humid forests, as well as subsequent human-induced fragmentation of forest habitat.

Key words: Madagascar, mammals, mitochondrial DNA, Rodentia, phylogeography

Madagascar is known for its unique biota and patterns of endemism at an island-wide scale to levels of microendemism at a local scale (e.g., Wilmé et al. 2006; Kremen et al. 2008). The island is also geographically complex, with varied topography, notable landscape heterogeneity, and numerous watershed systems (Chapron et al. 1993). Several hypotheses, based on large-scale contemporary and historical factors, have been proposed and tested to explain these patterns of endemism, such as riverine barriers, ecogeographic constraints, and watershed retreat and dispersion (reviewed in Vences et al. 2009). Given the varied physical geography of Madagascar, further taxon specific investigations conducted at a regional scale are needed to provide additional insights into the evolution of endemic taxa and their biogeographic patterns.

The fields of phylogeography and population genetics provide powerful frameworks for conducting such investigations by examining the distribution of genetic variation and the history of populations and lineages (e.g., population structure, phylogeographic groups, and historical demography). The associations of genetic patterns with landscape features and landscape-level environmental changes through time form the basis for understanding different biogeographic patterns, and can also be informative about the spatial and temporal dynamics of historical factors, particularly when fossil evidence is missing (e.g., Beheregaray 2008; Hickerson et al. 2010; Chan et al. 2011).

Our main study area, the Loky-Manambato region, is located in the northeastern portion of Madagascar (Figure 1).

- Ramasindrazana, B., B. Rajemison & **S. M. Goodman**. Bio-écologie des chauves-souris de Parc National de Tsimanampetsotsa. 2. Variation interspécifique et saisonnière du régime alimentaire. *Malagasy Nature*, 6: 117-124.
- Raselimanana, A. P., M. J. Raheirilalao, V. Soarimalala, C. J. Gardner, L. D. Jasper, M. C. Schoeman & **S. M. Goodman**. Un premier aperçu de la faune de vertébrés du bush épineux de Salary-Bekodoy, à l'ouest du Parc National de Mikea, Madagascar. *Malagasy Nature*, 6: 1-23.
- Rasoma, R. V. J., A. P. Raselimanana, Y. R. Ratovonamana & J. U. Ganzhorn. In press. Habitat use and diet of *Astrochelys radiata* in the sub-arid zone of southern Madagascar. *Chelonian Conservation and Biology*.
- Reynes, J.-M., N. Razafindralambo, V. Lacoste, M.-M. Olive, T. B. Andrianaivo, V. Soarimalala, J.-M. Heraud, A. Lavergne. Submitted. Anjozorobe virus: a hantavirus detected in rodents from Madagascar. *Emerging Infectious Diseases*.
- Richards, L. R. Taylor, P. J., Schoeman, M. C., **Goodman, S. M.**, Van Daele, P. A. & Lamb, J. M. Cranial size and shape variation in Afrotropical *Otomops*: testing species limits using a morphometric approach. *Biological Journal of the Linnean Society*, 106: 910-925.
- Ruedi, M., N. Friedli-Weyeneth, E. C. Teeling, S. J. Puechmaille & **S. M. Goodman**. Biogeography of Old World emballonurine bats (Chiroptera: Emballonuridae) inferred with mitochondrial and nuclear DNA. *Molecular Phylogeny and Evolution* 64: 204-211.
- Samonds, K. E., L. R. Godfrey, J. R. Ali, **S. M. Goodman**, M. Vences, M. R. Sutherland, M. T. Irwin & D. W. Krause. Spatial and temporal arrival patterns of Madagascar's vertebrate fauna explained by distance, ocean currents, and ancestor type. *Proceedings of the National Academy of Sciences, USA*. www.pnas.org/cgi/doi/10.1073/pnas.1113993109.
- Schoeman, M. C. & **S. M. Goodman**. Vocalizations in the Malagasy cave-dwelling fruit bat, *Eidolon dupreanum*: Possible evidence of incipient echolocation? *Acta Chiropterologica*, 14: 409-416.
- Taylor, P. J., **S. M. Goodman**, F. H. Ratrimomanarivo, J. Lamb & M. Corrie Schoeman. Wing loading correlates negatively with genetic structuring in eight species of Afro-Malagasy bats (Molossididae). *Acta Chiropterologica*, 14: 53-62.
- Tortosa, P., H. Pascalis, V. Guernier, E. Cardinale, M. Le Corre, **S. M. Goodman** & K. Dellagi. Deciphering arboviral emergence within insular ecosystems. *Infection, Genetics and Evolution* <http://dx.doi.org/10.1016/j.meegid.2012.03.024>.
- Wilkinson, D. A., S. Temmam, C. Lebarbenchon, E. Lagadec, J. Chotte, J. Guillebaud, B. Ramasindrazana, J.-M. Heraud, X. de Lamballerie, **S. M. Goodman**, K. Dellagi & H. Pascalis. Identification of novel paramyxoviruses in insectivorous bats of the southwest Indian Ocean. *Virus Research*, 170: 159-163.

Un premier aperçu de la faune de vertébrés du bush épineux de Salary-Bekodoy, à l'ouest du Parc National de Mikea, Madagascar

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Résumé

Peu d'information scientifique est disponible sur la faune de la forêt de Salary-Bekodoy, qui fait partie du bloc forestier de Mikea et est adjacente à la partie Ouest du Parc National de Mikea. Cette forêt a fait l'objet d'un inventaire biologique de la faune des vertébrés pendant sept jours au début du mois de décembre 2011. Les groupes cibles incluent les amphibiens, les reptiles, les oiseaux et les mammifères. Des méthodes standardisées telles que le piégeage, la capture à l'aide de filets, les observations directes, la fouille systématique et l'itinéraire échantillon ont été adoptées. Au cours de la visite sur le terrain, l'investigation a permis de recenser 28 espèces d'herpétofaune dont 12 sont endémiques de la région du Sud-ouest et du Sud et rarement rencontrées. Ces espèces sont d'ailleurs peu représentées au sein du réseau des aires protégées. Cinquante espèces d'oiseaux dont 12 restreintes à la forêt sèche et deux se rencontrant

uniquement dans la région du Sud-ouest ont été répertoriées. La forêt de Salary-Bekodoy constitue également la nouvelle limite nord connue de la distribution de *Coua verreauxi*. Deux espèces de petits mammifères, une espèce de chauve-souris et deux espèces de lémurins y ont été aussi répertoriées. Les informations récoltées sont d'une importance non négligeable aussi bien sur le plan biologique que biogéographique et enrichissent la connaissance relative à cette forêt.

Mots clés : Reptiles, oiseaux, mammifères, bush épineux, Madagascar

Extended abstract

To date, no scientific information is available concerning the faunal diversity of the Salary-Bekodoy Forest, in the western portion of the dry forest of the Mikea region, and adjacent to the western limit of the Mikea National Park. A multidisciplinary survey was carried out for seven days in early December 2011 to investigate the vertebrate faunal diversity of this forest. The target groups included amphibians, reptiles, birds, terrestrial small mammals, bats, carnivora, and lemurs. Standard survey methods were used in the representative habitats of the area, including pitfall, Sherman and national traps, mist nets, direct observation, refuge examination, and transect sampling. Despite the dry weather, which is not favorable to animal activity, the investigation revealed 28 species of reptiles, 12 of which are endemic to the south and southwest regions and rarely encountered; these include the burrowing snake *Liophidium chabaudi*, the arboreal snake *Lycodryas inornatus*, and an arboreal day gecko *Phelsuma standingi*. These species are poorly represented in the existing protected area network. Fifty bird species were recorded, of which 12 are confined to the Malagasy dry forest, and two "Vulnerable" species, *Monias benschi* and *Uratelornis chimaera*, only occur in the region between the Mangoky and Fihrenana Rivers. The Salary-Bekodoy Forest represents the new northern distributional limit of the "Near Threatened" bird species *Coua verreauxi*. Two species of tenrecs (*Geogale aurita* and *Echinops telfairi*), one bat species (*Trienops furculus*), and two lemur species (*Lepilemur ruficaudatus* and *Microcebus griseorufus*)

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