Annual Report for 2019

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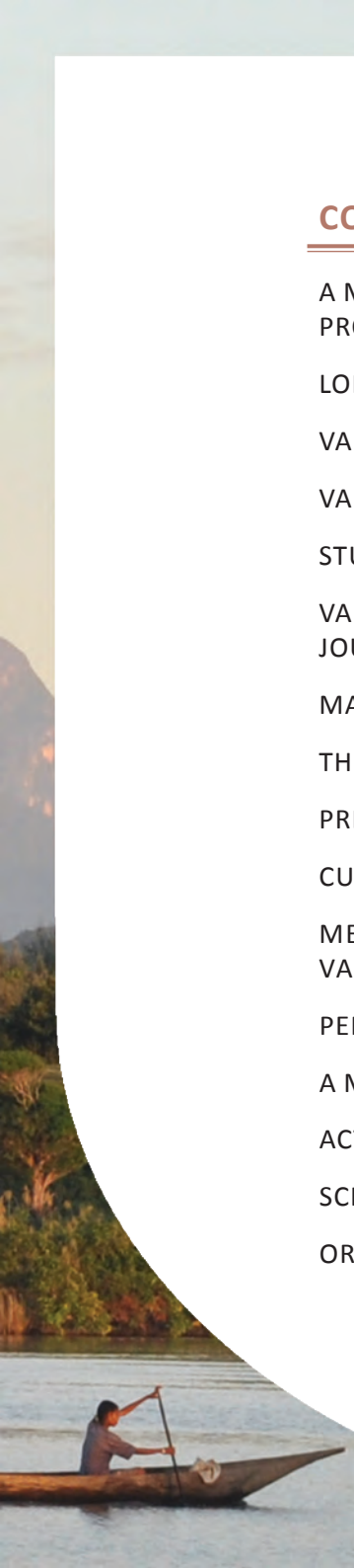

A MESSAGE FROM THE PRESIDENT OF VAHATRA, ACHILLE P. RASELIMANANA, PROFESSEUR TITULAIRE

The year of 2019 was one of success, but also one of challenges for Association Vahatra. A little less than three years ago, Vahatra undertook a large-scale project to update the frequently referenced book "*Madagascar: Revue de la conservation et des aires protégées*" by Martin Nicoll and Olivier Langrand (1989), a work we have used over the past 30 years for different aspects of work concerning the protected area system of Madagascar. This new bilingual book (French-English) of three volumes, slightly over 1700 pages, and focused on 98 terrestrial sites, included the active contribution of many Malagasy and foreign scientists, and natural resource managers under the coordination of the Vahatra editorial team. The official launch was in early 2019 and highlighted the critical importance of individuals and organizations, regardless of their respective area of intervention, to assemble their collective efforts and knowledge for Madagascar and the world related to nature conservation to have an up-to-date reference on the island's terrestrial protected areas.Well over 130 copies of the book were distributed free of charge, targeting in particular protected area managers, universities and research institutes, and decision-makers in the area of biodiversity management and conservation. In the interest to increase the ease of access to information and data in the protected area book, Association Vahatra has now revised the printed version and is preparing an e-book version, which will be available in mid-2020.

Soon after the protected areas book launch, given the interest that students, scientists, site managers, and decision-makers have in the availability of documents that are easily accessible and scientifically well-founded concerning Malagasy biodiversity and natural history, Association Vahatra thought it appropriate to prepare a 2nd edition of the major work published in 2003, entitled "*The Natural History of Madagascar*". This new book project is a great challenge insofar as it covers several aspects on history of biological exploration of the island, geology and paleontology, climatology, microbes and emerging diseases, forest ecology, human ecology, marine ecosystems, invertebrates, plants, land and freshwater vertebrates, and conservation actions. Over the past decades, since the publication of the 2003 book, remarkable strides have been made in understanding different aspects of Madagascar, its ecology and biodiversity, with literally something approaching exponential growth in information, and our aim in this new book is to highlight this progress. Also of particular importance and an aspect that makes us proud is the role national scientists and student researchers have made in these advancements. The launch of this new project was followed by immediate action, and the long tedious task of writing and editing is advancing at a good pace. The goal is to submit the book manuscript, which is anticipated to be over 9000 pages of text, to The University of Chicago Press in early 2021.

In order to contribute to the promotion of protected areas with the modest means at its disposal, Vahatra has helped to create some infrastructure at a few sites to help managers and users. These include, for example, a meeting-dining space at Ambohitantely that Association Vahatra uses during field schools at the site, and sinking a deep well at Ankarana near the "Campement des Princes" (Mahamasina) and now, for the first time, the eastern side of the Ankarana Massif has accessible water!

Of course we advance, and with each step forward there is the realization of what else needs to be done and the range of challenges that remain before us. However, with the encouragement and support of our friends and colleagues, the association is always ready to move forward in the accomplishment of its mission. Thanks to all that have helped in the past and perhaps in the future!

Achille P. Raselimanana

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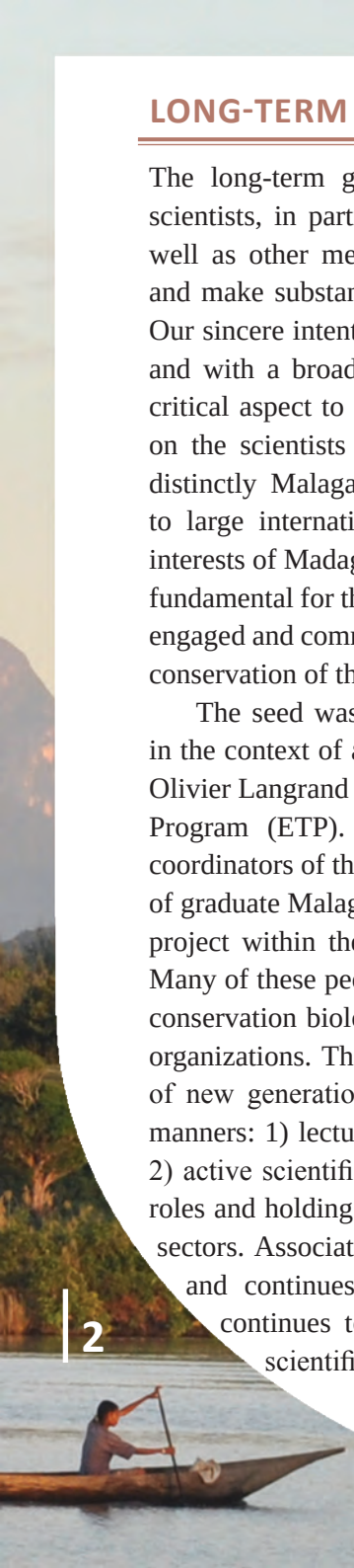
LONG-TERM GOALS

The long-term goals of Association Vahatra are to advance Malagasy scientists, in particular graduate students within the university system, as well as other members of the national conservation biology community, and make substantial advances in understanding the island's unique biota. Our sincere intent is to put in place an organization with a long-term future and with a broad and evolving vision adapted to the existing context. A critical aspect to mention is that we have created this vision largely based on the scientists and students working with the association, and, hence, distinctly Malagasy in prospective. 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 their own conviction with regard to the study and conservation of their natural heritage.

The seed was planted for Association Vahatra over three decades ago in the context of a project organized by WWF-Madagascar, put in place by Olivier Langrand and Sheila O'Connor, and known as The Ecology Training Program (ETP). Steve Goodman and Achille Raselimanana were the coordinators of the project for many years, during which several generations of graduate Malagasy students completed their higher degrees as part of this project within the university system in animal and conservation biology. Many of these people are amongst the major actors in the current Malagasy conservation biologist community within private sectors and governmental organizations. These individuals are now responsible for the advancement of new generations of national field biologists in at least three different 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. Association Vahatra places strong emphasis on capacity building and continues this tradition and the body of well-trained nationals continues to grow, as well as dissemination of information to the scientific community and the broad Malagasy public.



VAHATRA – PERMANENT STAFF

1. Professor Achille P. Raselimanana – President of Vahatra and Professor, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo. Founding member. Achille was in the first generation of ETP graduates (see above text under long-term goals) 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 Université de La Réunion, which is the highest scientific degree in the French university system. Achille is a herpetologist with considerable experience in aspects ranging from field studies, classical taxonomy to molecular systematics. Before the creation of Association Vahatra, he held for nearly a decade the position of Biodiversity Program Officer for WWF-Madagascar. In 2018, Achille was named "Professeur titulaire" by the Ministère de l'Enseignement Supérieur et de la Recherche Scientifique.
2. Dr. Marie Jeanne Raherilalao – Co-editor of the journal *Malagasy Nature* and books published by Vahatra and Professor, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo. Founding member. Marie Jeanne did her Ph.D. associated with the ETP (see above text under long-term goals). She works on bird ecology, biogeography, and systematics.
3. Dr. Voahangy Soarimalala – Scientific Coordinator at Vahatra; Head Curator, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo; and Professor, Université de Fianarantsoa. Founding member. Voahangy did her DEA and Ph.D. in association with the ETP (see above text under long-term goals). Voahangy is a mammalogist with a particular interest in rodents and tenrecs. She was elected in 2018 as the College President, Université de Fianarantsoa.
4. Professor Steven M. Goodman – Scientific Advisor and Vice President at Vahatra; co-editor of the journal *Malagasy Nature* and books produced by Vahatra; and Docteur Honoris Causa, Université d'Antananarivo. Founding member. Steve works on both mammals and birds. He holds the post of MacArthur Field Biologist, Field Museum of Natural History, Chicago, and is based in Madagascar most of the year.
5. Mrs. Sabrina Raharinirina – Financial & Administration Manager. Sabrina joined the association in October 2015.
6. Mr. Rachel Razafindravao called "Ledada" – logistic coordinator. Ledada started working with the ETP some 26 years ago and transferred to

Vahatra in October 2007. He has helped organize logistics for hundreds of field missions to some of the remotest areas on Madagascar.

7. Mrs. Sandra Ratsirahaingotiana – domestic help. She has worked with Vahatra since May 2016.
8. Mr. Elisa Malaimbohitsy, Mr. Mara Avisoa, and Mr. François Tsitindria – guardians.

VAHATRA'S BOARD OF DIRECTORS

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

Malagasy nationals

1. Professor Daniel Rakotondravony – Mention Zoologie et Biodiversité Animale, Université d'Antananarivo. He was recently retired, but still active with research and students supervision.
2. Ms. Nanie Ratsifandrihamanana – Country Director, WWF-Madagascar.
3. General Guy Ratrimoarivony – Retired Général de Corps d'Armée, Director of Strategy Seminar, Center for Diplomatic and Strategic Studies.
4. Ms. Chantal Andrianarivo – Former Head of Research and Biodiversity, Madagascar National Parks and now Technical Advisor at Indian Ocean Commission.
5. Professor Joelisoa Ratsirarison – Département des Eaux et Forêts de l'Ecole Supérieure des Sciences Agronomiques, Université d'Antananarivo and Vice President of the University of Antananarivo in Charge of International Relations.
6. Professor Raoelina Andriambololona – Institut National des Sciences et Techniques Nucléaires (INSTN), Université d'Antananarivo, General Director of INSTN and Member of the Malagasy Academy.

Foreign members

1. Professor Jörg U. Ganzhorn – Professor, Tierökologie und Naturschutz, University of Hamburg.
2. Mr. Paul Goodman – Principal, Kingfisher Group.
3. Mr. Olivier Langrand – Executive Director, Critical Ecosystem Partnership Fund (CEPF).
4. Mr. Michael Polsky – President, Invenergy.

STUDENTS

As capacity building for the next generations of national field and conservation biologists is at the core of Association Vahatra activities, we work directly with Malagasy students registered within the national university system and at the levels of different types of higher diplomas: License, Master's II or Ph.D. degrees. Recently, the association continue to financially support some students for a Post-doc position. In recent years, the Malagasy national university has shifted from the classical French scheme to that of an Anglophone License-Masters-Doctorate (LMD) system. Further, the scientific members of Vahatra are also in contact with many other Malagasy students as secondary advisors or members of thesis and other types of mentoring committees. We make a dedicated effort to work with graduate students in universities outside of the capital city of Antananarivo, including the former provincial capitals of Antsiranana, Toliara, Fianarantsoa, Toamasina, and Mahajanga. In addition, Vahatra staff members advise many other Malagasy students on aspects of their research, access to literature based on the fine library housed at Vahatra, and other forms of mentorship. Furthermore, several Ph.D. candidates working with other institutions or NGOs frequently request Vahatra scientists to be members of their graduate study committees. Further, Vahatra scientific members were requested on numerous occasions in 2019 to review grant applications to international agencies and foundations.

Since Vahatra open its doors in late 2007, something approaching 2420 different student and research visitors not directly part of the association's mentoring program have visited the office to use the library facilities or consult with the scientific staff. (These figures are based on a sign-in notebook.) In 2019 alone, over 70 different students and researchers from different faculties (Science, Agronomy, Veterinary Medicine, etc.) of national and private universities visited our library and many hundreds of documents (books, reprints, theses, etc.) were consulted.

Malagasy students passing through the Vahatra program have considerable success finding permanent jobs within the national governmental and non-governmental sectors. 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, etc. Some of the former students hold key posts, for example, in different managerial capacities, such as at UNESCO, mining companies, The Ministry of Higher Education and Scientific Research, and The Ministry of Forestry and Environment. Hence, one of the mandates of the association, to advance science and conservation on Madagascar with focused mentorship of graduate students, is indeed meeting the intended expectations. A good example of this is that numerous Vahatra graduates have obtained university appointments, providing an even greater means to advance capacity building for Malagasy field and conservation biologists. Below is the list of 2019 graduate students working on Licence, Master's II, and Ph.D. degrees under the direction of Vahatra scientists. After receiving their higher degrees from the university in collaboration with Association Vahatra, these well-trained young scientists are for the most part dynamic and with long-term visions, capable of designing and implementing research projects, and obtaining associated funding.

Graduate diplomas presented in 2019 or in preparation

As can be seen from the following lists, the scientific members of Vahatra are actively involved in the advancement of Malagasy graduate students. We consider this one of the hallmarks of the association. Further, we encourage students to publish the results of their scientific work (see below, "Scientific outputs of Vahatra during 2019") and take their rightful place in the international scientific community.

A) License, Master, Ph.D., and HDR diplomas defended with implication of Vahatra scientists as a supervisor, lecture committee member or jury member

1. Alumbaugh, J. 2019. Morphological analysis of subfossil *Macronycteris* spp. (family Hipposideridae) from Madagascar. Master's thesis, Northern Illinois University.
2. Ameliad, H. 2019. Ecologie et priorité de conservation des vertébrés terrestres d'Anjouan (Union des Comores). Thèse de doctorat en Sciences Agronomique et Environnementales, Université d'Antananarivo.
3. Andrianjakanomenjanahary, T. 2019. Comportement alimentaire et utilisation de l'habitat de *Propithecus diadema*, Bennet, 1832 dans la Nouvelle Aire Protégée de Maromizaha pendant la saison humide. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
4. Nomenjanahary, E. S. 2019. Diversité des vestiges des animaux de l'Holocène et actuels de deux grottes au sein de la nouvelle aire protégée de Beanka (Région Melaky). Mémoire de Master II, Sciences et Technologies, Anthropologie Biologique et Evolution, Université d'Antananarivo.
5. Raherimamonjy, L. S. 2019. Etude des Monogènes parasites des Cichlidés des régions d'Analamanga et d'Itasy, Madagascar. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
6. Ranarilalatiana, T. 2019. Diversité de *Copelatus* Erichson, 1832 (Coleoptera, Dytiscidae) de Madagascar et des Coléoptères Hydradephaga dans les vestiges forestiers du haut plateau central particulièrement sur les réserves de Manjakatompo-Ankaratra, d'Ambohitantely et d'Anjozorobe-Angavo. Thèse de doctorat, Ecole Doctorale Sciences de la Vie et de l'Environnement, Spécialité Entomologie, Université d'Antananarivo.
7. Randimbiarison, F. T. 2019. Réactions comportementales d'*Eulemur rufifrons* aux cris de certaines espèces d'oiseaux dans la forêt de Kirindy. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
8. Randriamahantantsoa, B. 2019. Biogéographie de l'herpétofaune et systématique des serpents Lamprohiidae (Fitzinger, 1834) de la formation karstique de Madagascar. Thèse de Doctorat, Faculté des Sciences, Université de Mahajanga.
9. Randriambololonaritoky, N. A. 2019. Contribution à l'étude du comportement d'*Hapalemur aureus* dans la forêt de Talatakely (Parc National de Ranomafana). Mémoire de Licence, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.
10. Randrianandrasana, F. 2019. Contribution à l'étude de comportement du *Mantella aurantiaca* en essai de repeuplement à Ambatovy-Analamay. Mémoire de Licence, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.
11. Ratsimbazafindranahaka, M. N. 2019. Dépendance maternelle : Morphométrie et dynamique de la nage des jeunes baleines à bosse (*Megaptera novaeangliae*) du Canal de Sainte Marie, Madagascar. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
12. Ronto, M. W. Adaptation bio-écologique et essai de réintroduction de la tortue radiée *Astrochelys radiate* Shaw, 1802 (Cryptodira: Testidinidae) sur le Plateau Mahafaly, Sud-ouest de Madagascar. Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.
13. Solonomenjanahary, J. 2019. Lutte antivectorielle contre le paludisme : Persistance dans le sol et dans l'eau des insecticides organophosphores et pyrethrinoïdes utilisés, analyses de l'efficacité des techniques d'épandage. Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.
14. Yasser, A. 2019. Etude dynamique de population des micromammifères non-volants de l'archipel de Nosy Ankao. Mémoire de fin d'études pour l'obtention du diplôme de Masters, Université d'Antsiranana.

B) Licence, Master's, and Ph.D. diplomas presented by student members of Association Vahatra and under the direction of Vahatra scientists

1. Rahariniaina Mirana, J. E. 2019. Distribution spatio-temporelle de la population de *Threskiornis bernieri* (oiseau aquatique, Threskiornithidae) dans le Complexe des zones humides de Mahavavy-Kinkony, Madagascar. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
2. Ramanantsalama, R. V. 2019. Etude du comportement et de l'écologie de *Rousettus madagascariensis* Grandidier, 1928 (Chiroptera : Pteropodidae) dans la grotte des Chauves-souris d'Ankarana, Nord de Madagascar. Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.
3. Ramanantsoa, A. D. 2019. Inventaire des petits mammifères dans la forêt d'Amboditanimena, Parc National Ranomafana en vue d'une restauration forestière. Mémoire de Licence, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.
4. Ratsimandresy, F. V. 2019. Contribution à l'étude des oiseaux disperseurs à Amboditanimena, Parc National de Ranomafana. Mémoire de Licence, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.

C) Licence, DEA, Ph.D. diplomas in preparation in direct collaboration with scientific members of Association Vahatra

1. Faliarivola, M. L. In preparation. Analyse du mode de partage des niches écologiques des oiseaux des forêts sèches malgaches. Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.

2. Horeau, A. In preparation. Les dynamiques de co-infections virales dans les colonies de chauves-souris de Madagascar et de La Réunion. Thèse de Doctorat, l'Université de la Réunion, France.
3. Rabearivony, J. In preparation. Caméléons: Indicateurs environnementaux, outils de la conservation. Habiliter à Diriger des Recherches (HDR),Facultés des Sciences, Université d'Antananarivo.
4. Rafanomezanjanahary, J. M. In preparation. Distribution des chauves-souris en dehors et dans le Parc National de Marojejy, Madagascar. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
5. Rajaonarivelo, J. A. In preparation. Implication des facteurs écologiques sur la répartition verticale de la forêt sèche malgache. Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.
6. Ranaivoson, T. N. In preparation. Diversité, écologie et ectoparasites chez les petits mammifères de la forêt humide sempervirente, des écotones et des milieux anthropiques de la Région de Mandena – Marojejy, Madagascar. Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.
7. Raobson, N. E. In preparation. Etude de la distribution et de la taille de la population du corbeau familier (*Corvus splendens*) dans les grands ports de Madagascar. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
8. Raolihanintrasina, S. E. In preparation. Etude bio-ecologique de l'oiseau invasif, *Passer domesticus* (Ploceidae), dans la ville de Toamasina, Madagascar. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
9. Rasoanoro, M. In preparation. Etude des parasites sanguins de chauves-souris de la partie orientale de Madagascar. Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.
10. Rasolonjatovo, S. M. In preparation. Phylogéographie et génétique des populations de *Mantidactylus bellyi* Mocquard, 1895 au niveau de la Montagne d'Ambre, Nord de Madagascar. Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.
11. Robsonmanitrandrasana, E. In preparation. Evaluation de l'état et de l'option de la conservation des populations de *Crocodylus niloticus* de Madagascar avec son utilisation durable. Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.
12. Safidiharizo, A. P. In preparation. Contribution à l'étude de l'adaptation écologique de *Mantella aurantiaca* (Mocquard, 1900) réintroduite dans la zone de conservation d'Ambatovy-Analamay. Mémoire de Licence, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.
13. Todilahy, L. J. In preparation. Régime alimentaire des chauves-souris insectivores dans la Station Forestière d'Ivoloina, Région d'Atsinanana. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
14. Vololona, J. In preparation. Etude des interactions entre *Rousettus madagascariensis* G. Grandidier 1928, (Pteropodidae) et les plantes vasculaires du Parc National d'Ankarana par des analyses polliniques. Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.

VAHATRA MEMBERS AS REVIEWERS OF PAPERS SUBMITTED TO SCIENTIFIC JOURNALS

As an indication of the role of Association Vahatra scientists play in the realm of published scientific papers, they served in 2019 as reviewers for papers submitted to the following international journals:

- *Acta Chiropterologica* (seven different papers)
- *Biological Journal of the Linnean Society*
- *Biotropica*
- *Journal of Zoology*
- *Molecular Ecology*
- *Proceedings of the National Academy of Sciences*
- *Tropical Zoology*
- *ZooKeys*
- *Zootaxa*

MALAGASY NATURE

Our intention with the scientific journal *Malagasy Nature*, which is published by Association Vahatra, is to advance peer-reviewed papers of high scientific and technical standards. As the review has an ISSN number, it is considered an international scientific journal. Manuscripts in French or English are passed through an editorial team, including a review process of international norms. 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 considerable hurdles and *Malagasy Nature* provides the means for these individuals to negotiate such problems. Based on this approach, this outlet plays an important role in regional capacity building, which in turn separates it from other international journals, for which the editors and associated editorial committee are not readily available to help with initial manuscript submission and revisions. Further, the journal allows Malagasy scientists

to return information to the worldwide scientific world. All of these aspects provide professional advancement for the Malagasy scientific community, specifically a certain sense of responsibility and for national authors to understand the importance of invested efforts when producing scientific articles. The manner the journal is published also guarantees the local availability of research results in the fields of ecology and biology conducted on Madagascar and neighboring islands, as compared to foreign scientific journals with copies or electronic files not readily downloadable or repatriated to Madagascar. All recent numbers of the journal are available on line and with free access (http://www.vahatra.mg/malagasynaturefr.html).

Marie Jeanne Raherilalao and Steven M. Goodman are the Editors of *Malagasy Nature* and a group of Associated Editors assists in different aspects with submitted manuscripts. We attempt to publish at least one volume of the journal each year. The 2019 volume included the following papers:

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1. **Morphologie pollinique de la flore de la Réserve Spéciale d'Ankarana, Madagascar** – Judith Vololona, Ralalaharisoa Z. Ramamonjisoa, Elysée N. Rasoamanana & Perle Ramavovololona.
2. **Morphométrie des fruits et des grains de *Ficus* (Moraceae) de la forêt sèche de la Réserve Spéciale d'Ankarana, Madagascar** – Judith Vololona & Steven M. Goodman.
3. ***Euphorbia pseudodidiereoides*, une nouvelle euphorbe épineuse du Centre-sud de Madagascar** – Jean-Phillipe Castillon & Landy Rajaovelona.
4. **A review of *Trypanosoma* species known from Malagasy vertebrates** – Mercia Rasoanoro, Beza Ramasindrazana, Steven M. Goodman, Minoarisoa Rajerison & Milijaona Randrianarivelojosia.
5. **Revue des stratégies nationales sur la biosécurité et perspectives sur la gestion des espèces exotiques envahissantes à Madagascar** – Toky Randriamoria.
6. **Population structure, activity pattern, and microhabitat use of *Phelsuma kleimmeri* at Mandrozo, Madagascar** – Lovasoa M. S. Rakotozafy.
7. **Succès de la reproduction et comportements de Polyboroide rayé (*Polyboroides radiatus*) dans l'Aire Protégée de Bemanevika, Nord-ouest de Madagascar** – Lily-ArisonRene de Roland, Marius Rakotondratsimba, Tsiresy M. Razafimanantsoa & Gilbert Razafimanjato.
8. **Les chauves-souris du Paysage Harmonieux Protégé du Complexe Tsimembo Manambolomaty, Région Melaky, Madagascar: diversité et biogéographie** – Ny Anjara F. Ravelomanantsoa, Fanomezantsoa Razafimalala, Zafimahery

Rakotomalala, Julie Ranivo, Gilbert Razafimanjato, Lily-Arison Rene de Roland, Beza Ramasindrazana, Claude F. Rakotondramanana & Steven M. Goodman.

9. **Seasonal movements of insectivorous bat species in southwestern Madagascar** – Stephanie Reher, Hajatiana Rabarison, Marie Schoroth & Kathrin Dausmann.
10. **Les rats dans le monde rural du Centre-est et du Centre-sud de Madagascar : dommages causes et système de contrôle** – Voahangy Soarimalala, Jean P. Randriamanana, Onjaniaina G. Razafindramasy, Radoniaina H. Oninjatovo, Antso Razakafamantanatsoa, Mandaniaina D. M. Randrianarisata, Gaëtan S. Benjamina, Deborah Raharinirina, Nantenaina M. Jao, David M. Raharisoa, Frasquita Rakotovao, James Rafanoharana & Steven M. Goodman.
11. **Feeding ecology of bokoboky, *Mungotictis decemlineata* (family Eupleridae)** – Bako Rasolofoniaina, Prisca Razafy, Aristide Andrianarimisa, Emilienne Razafimahatratra & Peter M. Kappeler.

Notes

1. **Mise à jour de la distribution du crapaud commun d'Asie (*Duttaphrynus melanostictus*) dans le sud de Toamasina, Madagascar** – Toky M. Randriamoria, Luckah A. Rafilipo & Jean François S. N. Fidy.
2. **Le bananier aquatique, *Typhonodorum madagascariensis* (famille des Araceae) dans la Commune rurale d'Ankililoaka, Sud-ouest de Madagascar** – Makboul Beny, Félicité Rejo-Fienena & Serge Tostain.
3. **Absence of *Trypanosoma* infection among *Hoplobatrachus tigerinus* (Amphibia: Dicroglossidae) from Boeny, western Madagascar** – Muriel N. Maeder, Rogelin Raherinjafy, Heritiana Andriamahefa, Beza Ramasindrazana & Milijaona Randrinarivolojosia.

THE PUBLISHING HOUSE OF THE ASSOCIATION VAHATRA

The year 2011 marked an important advancement for Association Vahatra with the creation of its own publishing house, focusing on 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, for example, North America, portions of Latin America or Western Europe, information on regional plants and animals are readily available in field guide format. These types of books, generally presented by taxonomic group (e.g. ferns, reptiles, birds, etc.) and region, revolutionized making information on biodiversity available and penetrable for members of different age and social groups in many various regions of the world. Such guides provide the means for individuals to become familiar with different plants and animals found in areas where they live or travel, and, most critically, integrating this familiarity into how they conceive the importance of the natural world. It is not an exaggeration to state that this

type of guides have led to the "greening" of different sectors of society in numerous countries. For Madagascar, which is so rich in biological diversity and being one of the principal conservation priorities in the tropics, the previous lack of such books created a considerable void, which Association Vahatra strongly believes needed to be filled.

Since 2011, eight books have been published in the series, which is edited by Marie Jeanne Raherilalao and Steven M. Goodman and, except for the last one, designed and typeset by Madame 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 & 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 & Steven M. Goodman, 2011, 146 pp.
4. *Les Carnivora de Madagascar* [The Carnivora of Madagascar] by Steven M. Goodman, 2012, 158 pp.
5. *Les animaux et écosystèmes de l'Holocène disparus de Madagascar* [The extinct Holocene animals and ecosystems of Madagascar] by Steven M. Goodman & William L. Jungers, 2013, 249 pp.
6. *Les amphibiens des zones arides de l'Ouest et du Sud de Madagascar* [The dry forest amphibians of western and southwestern of Madagascar] by Franco Andreone, Gonçalo M. Rosa & Achille P. Raselimanana, 2014, 180 pp.
7. *Les amphibiens du Nord de Madagascar* [*The amphibians of northern Madagascar*] by Franco Andreone, Angelica Crottini, Gonçalo M. Rosa, Andolalao Rakotoarison, Mark D. Scherz & Achille P. Raselimanana, 2018, 355 pp.
8. *Fourmis de Madagascar: Un guide pour les 62 genres* / *Ants of Madagascar: A guide to the 62 genera* (a bilingual French-English book) by Brian Fisher & Christian Peeters, 2019, 253 pp.

The production of the first three books in the series was financed by a grant from the Critical Ecosystem Partnership Fund (CEPF). Subsequently, a generous grant from the Ellis Goodman Family Foundation allowed additional guides in the series to be published. We plan to continue the series

and the next to be published in due course and graciously subsidized by the Ellis Goodman Family Foundation and Paul Goodman includes:

9. *The damselflies and dragonflies of Madagascar* - by K. D. Dijkstra & Callen Cohen. This bilingual French-English book is anticipated in late 2020.

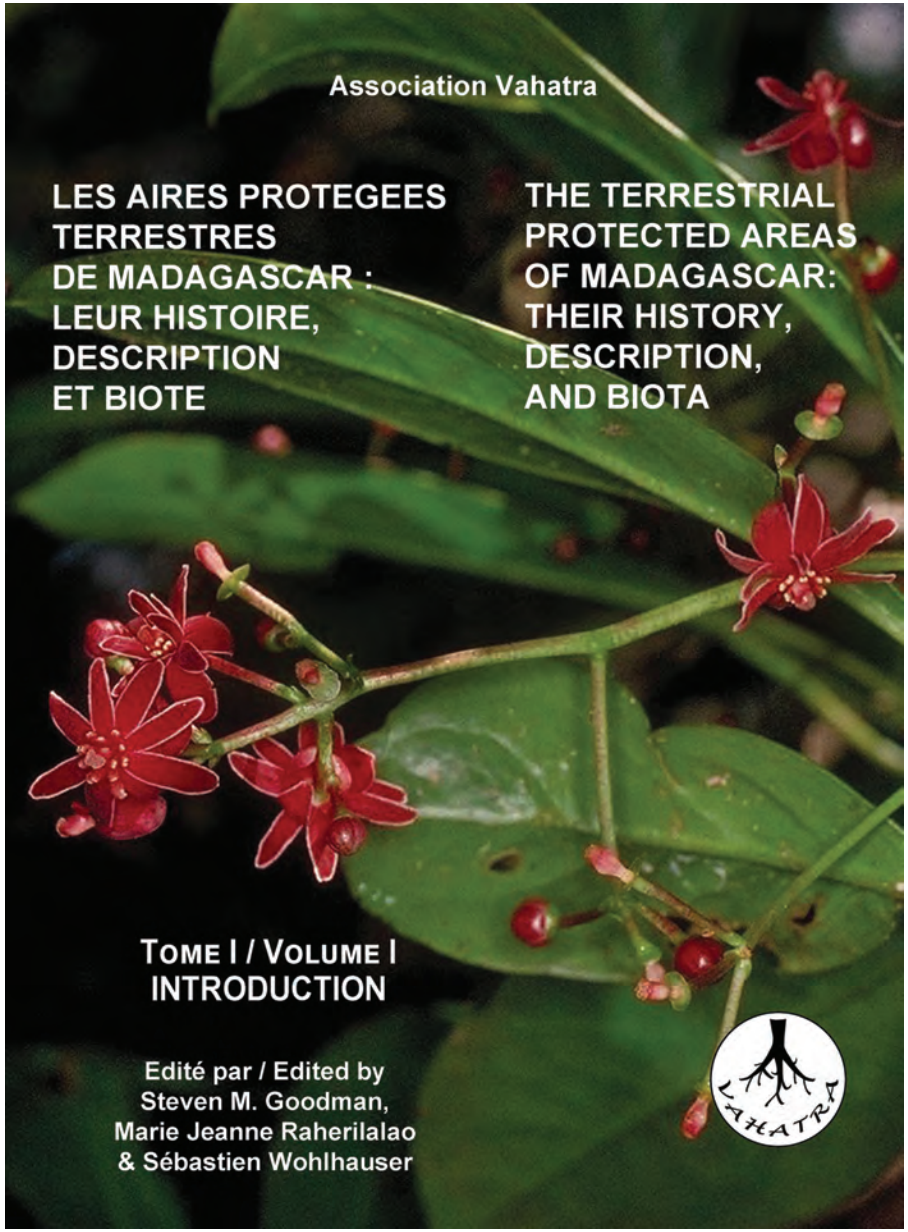
To date, other than free or at production costs diffusion of Vahatra Press books to Malagasy students and scientists, numerous copies have been sold to people coming to the Vahatra office, at different fairs in Antananarivo, and through overseas booksellers. We are pleased with the interest these books have generated, which includes seeing young Malagasy students and naturalists as well as tourists carrying and consulting the books on field trips to different forested areas. Further, these books are important resources for national students and researchers, as well as reference works for different university courses. The University of Chicago Press is now responsible for the distribution of books in this series in North America and Europe, and the *Atlas of selected vertebrates of Madagascar* published in late 2013, as well as The terrestrial protected areas of Madagascar: Their history, description, and biota released in March 2018 (see http://www.press.uchicago.edu/ucp/books/publisher/pu3431914_3431915.html).

PRESENTATION OF PROTECTED AREA BOOK

In 1989, Martin Nicoll and Olivier Langrand published a book entitled "*Madagascar: Revue de la conservation et des aires protégées*" (WWF, Gland), an important landmark in the early recent development of Madagascar's protected area. In a clear and succinct manner, these authors compiled information, including vertebrate species lists, available at that time for each site, and important sections on the future strategies to conserve the remaining natural habitats of the island. Since then, that is to say over slightly less than three decades, the biological exploration of the remaining forests and other ecosystems of the island has advanced considerably, associated with large-scale advances in our knowledge of the fauna and the flora, including the description of several thousand new species to science, and many new protected areas have been established. As is the nature with such syntheses and a sign of advancement, the Nicoll and Langrand book is now out of date and in need of revision.

With a grant from Critical Ecosystem Partnership Fund (CEPF), Association Vahatra in collaboration with the Field Museum, "Fondation pour les Aires Protégées et la Biodiversité de Madagascar" (FAPBM), and numerous other organizations (see below), including Madagascar National Parks, undertook a project to revise and expand the Nicoll and Langrand book. This three-year project involved many different facets, including a tabulation of the recognized terrestrial protected areas as of mid-May 2015; scanning and organizing over 10,000 documents concerning the biota occurring at these sites and associated legal documents; a large-scale review and updating of a database of the vertebrates and plants of each site; systematic reviews of the different groups covered in the book; biological inventories of poorly known sites; and numerous other activities.

The bilingual (French-English) book edited by Steven M. Goodman, Marie Jeanne Raherilalao, and Sébastien Wohlhauser and entitled "*Les aires protégées terrestres de Madagascar : leur histoire, descriptions et biotes / The terrestrial protected areas of Madagascar: their history, descriptions and biota*" was published in late 2018 by Association Vahatra and presented to the Malagasy scientific and conservation communities in early 2019. The book, which is in three volumes and weighs 6.8 kg, contains 1716 pages, over 800 color images, several hundred maps, and close to 400 tables. The first volume (424 pages) is an introduction to




Association Vahatra
LES AIRES PROTEGEES TERRESTRES DE MADAGASCAR :
LEUR HISTOIRE, DESCRIPTION ET BIOTE
THE TERRESTRIAL PROTECTED AREAS OF MADAGASCAR:
THEIR HISTORY, DESCRIPTION, AND BIOTA
TOME II : LE NORD ET L'EST DE MADAGASCAR
VOLUME II: NORTHERN AND EASTERN MADAGASCAR
Edité par / Edited by Steven M. Goodman,
Marie Jeanne Raherilalao & Sébastien Wohlhauser
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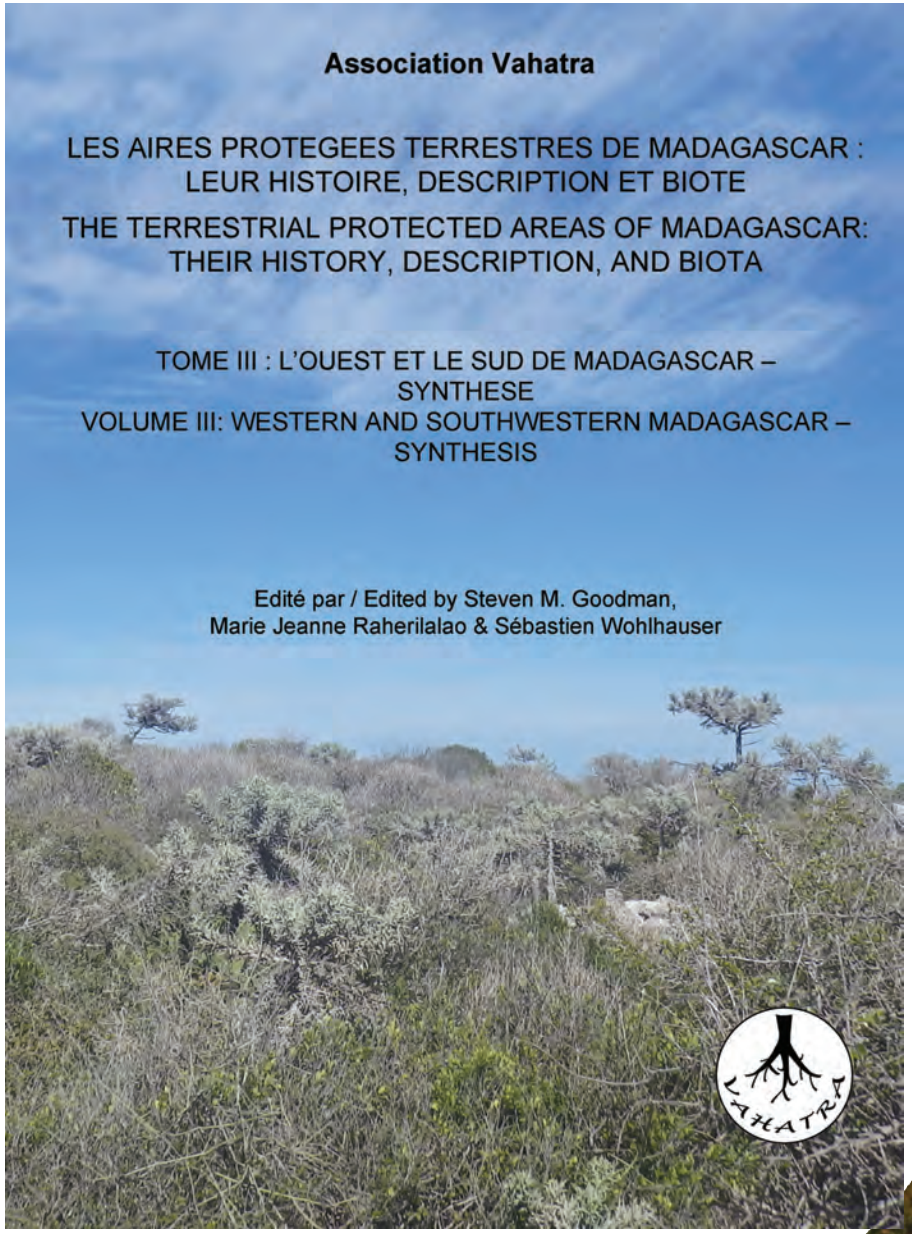
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TOME III : L'OUEST ET LE SUD DE MADAGASCAR –
SYNTHESE
VOLUME III: WESTERN AND SOUTHWESTERN MADAGASCAR –
SYNTHESIS
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a wide range of different subjects and contains 16 different chapters; the second volume (808 pages) covers protected areas of the eastern portion of the island; and the third volume (483 pages) deals with sites in the west, as well as two synthetic chapters. This book will be of beneficial use to protected area managers, provide a major boost and incentive for different forms of national and international ecotourists visiting the island's protected areas, and form an important reference for biologists and students working in different domains touching conservation biology.

A range of different activities took place in 2019 associated with the book. On 1 March there was a formal presentation the Malagasy conservation and scientific communities at the University of Antananarivo. This event was attended by several hundred people (standing room only!), and formal presentations were made by Achille Raselimanana, President Association, who was also the master of ceremony; Professor Félicitée Rejo, who was the Minister of Higher Education during this period; Professor Panja Ramanoelina, President of the University of Antananarivo at the time; Mr. Olivier Langrand, Executive Director, CEPF; Dr. Guy Suzon, General Director, Madagascar National Parks; and Professor Steven M. Goodman, Association Vahatra. After the formal presentations the

group moved to a nearby room for a reception and distribution-book signing, including copies for the President and Prime Minister of Madagascar. There was a number of newspaper articles and television reports on the book and presentation.

Subsequently, the editors made a general book presentation at the l'Institut Français de Madagascar in Antananarivo on 9 March, led by Sébastien Wohlhauser and with Marie Jeanne and Steve present to help answer questions. There were two different presentations at The Field Museum of Natural History in the first half of June, with all three book editors present.

Finally, we would like to thank a number of donors for helping with the financing of this project and their support (in alphabetical order): Biodiversity Conservation Madagascar, Joyce and Bruce Chelberg, Conservatoire et Jardin Botaniques (Geneva), Critical Ecosystem Partnership Fund, Field Museum of Natural History, Ellis Goodman Family Foundation, The Leon M. and Harvey B. Helmsley Charitable Trust, Liz Claiborne and Art Ortenberg Foundation, MacArthur Foundation, Madagascar Biodiversity Foundation, Madagascar National Parks, Ministère de l'Environnement de l'Ecologie et des Forêts, Nitidae, and Michael and Tanya Polsky.

CURRENT VAHATRA PROJECTS AND GRANTS

1. Helmsley Charitable Trust – capacity building, phase II

This project, entitled "Development of scientific capacity for Malagasy conservation biologists", commenced in January 2017. The project has four different aspects: 1) field schools each year focusing on young Malagasy graduate student to help in their scientific orientation and skill development; the participant groups will also include some individuals working in protected areas management (e.g. Madagascar National Parks) and field practitioners for conservation organizations (most selected from other HCT financed projects); 2) field studies and different forms of mentoring for five Ph.D. students and two Master's II students enrolled at The University of Antananarivo; 3) continued advancement of scientific and general publications associated with Vahatra scientists and students, as well as the Malagasy scientific community, and 4) the publication of a large-scale synthesis on the protected areas of Madagascar (see above, "Presentation of protected areas book").

In 2019, two different field schools were carried out. The first was held between 20 and 26 April, in the Réserve Spéciale d'Ambohitantely, Analamanga Region and was attended by 18 students from the University of Antananarivo, as well as one from the Lycée Français of Ambatobe, Antananarivo. The second took place

in the Réserve Spéciale d'Ankarana with six students from The University of Antsiranana and one from The University of Antananarivo, and two conservation agents of Madagascar National Parks working in the same protected area.

During the course of these multidisciplinary field schools, these students interact directly with professional biologists working in different disciplines of zoology. During the second field trip, they have also the opportunity to profit the presence of a specialist on botany and another scientist specialist on lichens. This kind of training provides an excellent means for each student to decide what group of animal or type of study they are the most interested with respect to their future research project and study. These outings are often eye-opening experiences for the young Malagasy participants. At the same time, they provide an excellent means for Vahatra to pick the students they would like to work with in advancing their Master or Ph.D. studies.

Concerning the status of student projects, three of the seven students (one Ph.D. degree and two master's degrees) affiliated with this grant have defended the results of their studies in 2019. The remaining ones are at a very advanced stage and will presented their researches at the first portion of 2020.

2. Critical Ecosystem Partnership Fund (CEPF) – e-book on the protected areas of Madagascar

In late 2015, Association Vahatra received a three-year grant from CEPF to conduct a large-scale review of the protected areas system of Madagascar. The book entitled: "Terrestrial protected areas of Madagascar: Their history, description and biota" was published by Association Vahatra in March 2019 (see above "Presentation of protected area book"). On the basis of a grant given to Strand Life Science (Bangalore, India) from CEPF, with Association Vahatra being a partner, an e-book version of a revised and corrected version of the protected area book is being prepared and should be available in mid-2020. The three volumes of the book are cumbersome and the e-book version will facilitate utilization. Other aspects of this project will be the creation of a website with lots of different details on 98 terrestrial protected areas of Madagascar, including up-to-date species lists of vertebrates known from each, as well as access to something on the order of 10,000 pdf files used in writing the book.

3. Critical Ecosystem Partnership Fund (CEPF) – regional capacity building project

In the latter portion of 2017, CEPF gave a three-year grant to Durrell Conservation Training Ltd (DCT), Mauritius, with the Association Vahatra and Mauritian Wildlife Foundation being associated partners, for a project entitled "Developing Indian Ocean Capacity for Conservation through Training and Exchange". The project, which ended in late 2019, was organized in three different training sessions, and each of which comprised two steps: 1) on Madagascar classroom lectures and field training (more details below) and 2) on Mauritius applied aspects of conservation. The 15 or so participants for each session are chosen based on a written application and interviews. Applications were open to people holding posts in the private sector, active in the domain of conservation and from Madagascar, Mauritius, the Seychelles, and the Union of the Comoros.

The objectives of the project were to advance regional capacity and to promote initiative to conserve biodiversity through measurable change for the trained individuals and in a regional sense allowing the creation of new networks and the creation of long-term collaborations. From the Association Vahatra side, two different types of interventions

were proposed to accomplish the training aspect. First, a week of lectures given to the participants at the Antananarivo office and by prominent individuals and projects dealing with different facets of conservation on Madagascar, with topics ranging from *in situ* and *ex situ* conservation, the positive and not so positive aspects of different conservation projects on the island, the complexity of certain conservation projects, the challenge the conservationists faced in the accomplishment of their activities, aspects of using scientific knowledge to advance projects, etc. The second aspect was for the participants to take part in a 12-day field school associated with biological inventories and the multi-faceted aspects of scientific research and the use of such data for advancing conservation. This field trip constitute also a mean for them to learn more about a case study that was expected to trigger discussion and interaction between the participants as well as with the site managers for a productive exchange. The site these field schools were held was in the Réserve Spéciale d'Ambohitantely, a threehour drive from Antananarivo. The instructors included a range of national and international scientists. During this activity, the participants were actively engaged in the capture and censusing of different invertebrates, vertebrates and plants, and a range of activities. A series of early afternoon daily lectures were given to bring together the practical aspects of their "retooling" and the manner these scientific activities are critical for the advancement of research and their application to conservation. The Director of Ambohitantely gave during each session a presentation to highlight the best practices in conservation and management of the protected area and practical aspects concerning involvement of local communities, integrate scientific knowledge, and different challenges.An outdoor open sided "chalet" was constructed that served as the lecture, eating space, and social site during the field school. This structure will be available for other research groups and tourists visiting Ambohitantely.

4. Critical Ecosystem Partnership Fund (CEPF) – Indian House Crow Eradication and invasive species surveillance

In the context of this project, Madagascar Flora and Fauna Group (MFG) in collaboration with Association Vahatra and otherpartners, received a grant to eradicate the recently introduced and highly invasive Indian House Crow (*Corvus splendens*) in the Toamasina area on the central eastern coast. The grant also aims at advancing different research projects associated with problems imposed on Madagascar's ecosystems and the Malagasy people by invasive animal species. MFG is responsible of the eradication of the Indian House Crow and Vahatra's intervention focuses on scientific aspects associated with the biology, distribution, and zoonotic diseases of the crow and House Sparrows (*Passer domesticus*)

in and around Toamasina. More specifically, scientific studies on invasive species, include those conducted by Master's students at both the University of Toamasina and the University of Antananarivo, and field projects of Vahatra scientists. These include studies on the distribution of the Indian House Crowin all major ports on the island and population estimates, and breeding biology of House Sparrows in the city of Toamasina. Projects on zoonotic diseases are in collaboration with the Mahaliana molecular laboratory in Antananarivo.

5. National Institute of Health (NIH) and the National Science Foundation (NSF) – and use in SAVA and global health challenges

In the context of a grant awarded to Duke University in 2019 through the Ecology and Evolution of Infectious Diseases (EEID) program, a joint initiative between the National Institute of Health and the National Science

Foundation (NSF). This is a large-scale project to understand the detailed linkages between diseases circulating in native forest, agricultural areas and around villages and for which endemic and introduced animals act as reservoirs and responsible for transmission. Association Vahatra is one of the collaborating organizations and specifically involved in research on bats, endemic and introduced small mammals,

and collecting the needed samples for the zoonotic disease analyses. In collaboration with Charles Nunn, Duke University, who is the Principal Investigator, the research project intends to study novel methods to predict disease spread and zoonotic and different forms of infectious diseases are a major health threat on Madagascar. Two students from the University of Antananarivo are taking part in this project: Tamby Ranaivoson working on small mammal ecology and reproduction in the context of his Ph.D. thesis and Johanna Rafanomezanjanahary working on bat ecology and habitat associations for her Master's degree.

6. UNESCO/Madagascar National Parks – initiatives for ecological restoration of degraded rainforests in the World Heritage Site "The Rainforests of the *Atsinanana*", Madagascar

The moist evergreen rainforests of the eastern region of Madagascar are home to an exceptional diversity of Malagasy flora and fauna. These heterogeneous ecosystems play a fundamental role in maintaining biodiversity and ecological processes. Their integration within UNESCO's network of World Heritage Sites is therefore a crucial step in supporting efforts to preserve their Outstanding Universal Values (OUV). Unfortunately, these keys ecosystems for different economic and cultural reasons, are often subject to

anthropogenic pressures. The 2009 political crisis on Madagascar, a period of near total anarchy, allowed people to rush massively into protected areas for illegal exploitation of rosewoods, gold panning, charcoal production, and deforestation to acquiring new agricultural land. The integrity of the biological diversity of these protected areas and their OUV have thus been seriously threatened. The magnitude of the situation was so large, the World Heritage Committee of UNESCO decided to classify in 2010 "The Rainforest of the *Atsinanana*" in the list of World Heritage in Danger.

Removing the different forests making up site from the Endanger list, requires outstanding scientific information on ecological and biological aspects, as well as a perspective for ecological restoration of degraded areas within these protected areas. The ultimate objective is to ensure that the natural process of habitat reconstitution and animal recolonization of degraded areas take place, reducing the progressive loss of natural forests and local extirpation of species. Association Vahatra was solicited by UNESCO to carry out associated research and inventory activities, including the assessment of the "health state" of local biodiversity and the ecological integrity of the sites (National Parks of Marojejy and Masoala). Moreover, for the conception and initiation of the ecological restoration project, Vahatra was solicited by Madagascar National Parks to implement a biological assessment of three protected areas (National Parks of Masoala, Ranomafana, and Andohahela) to identify and prioritize the areas for the restoration and an analysis of local community involvement in this project. A guide for ecological restoration was produced. This guide includes among others activities to be conducted depending on the types of restoration (passive, assisted passive, and active), and associated plant species in "The Rainforest of the *Atsinanana*". It is the first ecological restoration concept for the site based on scientific data taking into account ecological processes and respecting the ecological structure and the plant community.

MEETINGS AND CONFERENCES IN 2019 ATTENDED BY ASSOCIATION VAHATRA

1. Island Biology Conference on La Réunion

The University of La Réunion was the host of the III International Island Biology conference, which is held every three years at a different place in the world and brings together students and researchers working on different aspects of island biology. Association Vahatra was invited by the University of La Réunion to attend the conference held between 8 and 13 July 2019 and take part in a special two day training session for regional graduate students attending the conference on writing scientific papers and publication, including the choose of the journal, respect proposed journal format, and the different steps to follow. Thanks to a grant received by the University of La Réunion from the regional Council of La

Réunion via the INTERREG Océan Indian 2014-2020 program for a project with the acronym “MIMUSOPS” and under the title “Sharing knowledge and promoting marine and terrestrial biodiversity in the Indian Ocean region” financial support was provided for eight Malagasy graduate students, one postdoc, and three professors from Association Vahatra and another from the University of Antananarivo to attended the meeting and workshop. These students gave either oral or poster presentations during the Island Biology meeting (see “Oral communications and posters”, below). Steve Goodman also gave a plenary lecture at the meeting and another presentation associated with faunal extinctions in recent geological time. Association Vahatra also had a book stall at the meeting. During this meeting, Achille was interviewed by the regional communication program associated with The University of La Réunion, concerning the history and activities of Vahatra with respect to capacity building and development.

2. 56th annual meeting of the Association of Tropical Biology and Conservation

Madagascar was chosen to host the 2019 annual meeting of the Association of Tropical Biology and Conservation, which was held in Antananarivo from 30 July to 3 August 2019. Overall 723 delegates from 44 countries, including 250 Malagasy participants, attended the five day conference held at the Ivato Conference Center. This was a major event for Madagascar and one of the intents of the local committee to have the meeting in Madagascar was to informnational and local politicians and business groups of the importance of the island’s renown biodiversity and bring to light the critical need for the country to take the necessary steps to conserve this natural patrimony in an immediate and clear fashion. This aspect was embodied in the petition of Ivato, presented in four languages (English, French, Malagasy, and Spanish (see https://www.atbc2019.org/), which was signed by hundreds of people from around the world and envisioned to be signed by the President of Madagascar or a designated Minister at the closing ceremony of the meeting. To date (January 2020), this latter step has yet to occur.

Association Vahatra was one of the local supporting organizations and with different members taking different roles: Achille Raselimanana was a member of the scientific committee, and chair for five sessions and Steve Goodman was the co-chair of the academic component. Steve also presented a plenary lecture during the conference.

Association Vahatra made available competitive grants for 30 Malagasy participants, including 17 graduate students and 13 professors/researchers to take part in the meeting. A number of oral and poster presentations were made by Vahatra students at the meeting. Vahatra also had a book stand.

3. 13th African Small Mammals Symposium (ASMS), Mekelle, Ethiopia

The 13th ASMS was held at Mekelle University in northern Ethiopia from 16 to 21 September 2019. The previous meeting was held in Madagascar in September 2015 and organized by Association Vahatra, specifically Voahangy Soarimalala and Steve Goodman. These two individuals were members of the International Scientific Committee for the Mekelle meeting, which they attended along with three Ph.D. students from Association Vahatra – all of these individuals gave oral or poster presentations at the meeting. The attendance of these different people was financed by a gift from Bob and Gail Loveman. One of the Vahatra students, Judith Vololona, was awarded as best student poster during the ASMS 2019.

PERSON IN FOCUS: STEVEN M. GOODMAN

In 2019, Steve Goodman received a couple of awards. At the closing ceremony of the 56th annual meeting of Association for Tropical Biology and Conservation in Antananarivo (see above), Steve was named by the association's council a life-time Honorary Fellow. This award which is the highest honor given by the association was given to him in recognition of his scientific contributions associated with biodiversity and conservation on Madagascar over the past three decades and his efforts in different aspects of the Madagascar meeting.

During the 2019 annual meeting of the American Society of Mammalogists Steve received the Aldo Leopold Conservation Award. In the citation for the award it was mentioned "Although the primary focus of Dr. Goodman's research has been on the mammals of Madagascar, he has conducted research in numerous other

African countries. His principal research interests are: 1) inventories of unknown or poorly known forested areas, 2) describing new species and elucidating the evolutionary history of Malagasy mammals, 3) application of gathered data in the advancement of conservation programs, and 4) capacity building for Malagasy conservation biologists, particularly graduate students. Dr. Goodman is a co-founder of the Association Vahatra, a grass-roots organization that promotes conservation of Madagascar's native fauna while training the next generation of Malagasy scientists in ecology and conservation biology. Over the last three decades, Dr. Goodman has helped create a whole generation of biologist and conservationists by training dozens of Malagasy graduate students and hundreds of undergraduates in modern ecological techniques, including best practices for field surveys, museum collections, data acquisition, and analysis… Every letter of support highlighted the profound and lasting impact he has had, not only on the understanding of mammalian taxonomy and conservation, but on the Malagasy people as well."

A MENTION OF THANKS

We would like to give a special thanks to a number of private donors that have financially supported different Vahatra activities over 2019, including advancement of graduate students conducting their studies in collaboration with Vahatra and a range of other activities. The list is ordered alphabetically by family name:

- Joyce and Bruce Chelberg
- Ellis Goodman Family Foundation
- Paul Goodman
- Bob and Gail Loveman
- Joe and Jo Ann Paszcyzk
- Michael and Tanya Polsky
- Bon and Charlene Shaw
- Jai Shekhawat
- Adelle Simmons
- Tom Stahl

ACTIVITIES OF VAHATRA PERMANENT SCIENTIFIC MEMBERS DURING 2019

January

As permanent faculty members in the national university system, most of the scientific members of Vahatra during this month were extensively involved in teaching, organizing exams, and their correction. Over and above these activities, these different individuals continued to work on different activities, including writing, proof reading, and revising of scientific articles, as well as the supervision of different aspects of student memoirs and theses. As scientific members of the ATBC (see above), Achille and Steve evaluated between them over 200 proposed abstracts submitted for presentation at the meeting. All Vahatra scientific members evaluated abstracts submitted by students for their possible attendance of the 2019 Island Biology Conference on La Réunion.

Following the scientific investigation carried out in the Masoala protected area at the end of 2018 by Achille, Marie Jeanne, and Voahangy with Jacquis Tahinarivony, a botanist from the Association Famelona, to design and implement an ecological restoration strategy and monitoring system in the area impacted by the exploitation of rosewood, they devoted time to the analysis of the fieldwork data and proposed a new scheme for the future ecological restoration strategy adapted for the protected area. This is a project in association with Madagascar National Parks and funded by Forest Ecosystem Restoration Initiative (FERI).

The scientific members of Vahatra, in collaboration with UNESCO Madagascar and Madagascar National Parks made a presentation to representatives from the Korea International Cooperation Agency (KOICA) on a project associated with a new project on helping with considerable conservation concerns in eastern Madagascar, specifically with a series of sites grouped in the UNESCO zone known as the "Rainforest of the *Atsinanana*"

February

Achille, Marie Jeanne, and Voahangy worked extensively on their Masoala report to FERI/Madagascar National Parks, as well as different university activities and responsibilities.

All four scientific members of Vahatra and Madame Sabrina Raharinirina were in full preparation for the presentation of the protected areas book planned for the 1 March 2019.

March

The month started with the presentation of the new protected areas book at the university (see Presentation of protected area book, above), for which Achille was the master of ceremony and Steve made a presentation on the book.

Voahangy and Marie Jeanne were then busy organizing the logistic aspects of fieldwork associated with site prioritization for ecological restoration of the UNESCO World Heritage sites, specifically in the Ranomafana and Andohahela National Parks, impacted by illegal exploitation of rosewood. This project was in collaboration with Madagascar National Parks. Together with Jacquis Tahinarivony, Achille, Voahangy, and Marie Jeanne carried out fieldwork associated with this project in Ranomafana and Andohahela.

Steve gave a lecture at Vahatra to a group of ecotourism guides working for private travel agencies in Madagascar and at different points in the month actively involved with meetings associated with the organization of the ATBC meeting in Antananarivo (July-August).

April

For the first half of the month, Achille, Voahangy, and Marie Jeanne continued with fieldwork at Ranomafana and Andohahela. Once back to Antananarivo, they worked on the report associated with this expedition. Towards the end of the month, the first semester of the university academic year commenced and most of the members are also actively involved in teaching activities.

Steve was active during the month with the organization of the ATBC meeting in Antananarivo (July-August), including starting to put together the program and abstract book and different aspects of financing. In the middle of the month he attended a meeting in Atsinanana associated with climate change and made a presentation on changes in ecosystems in recent geological time.

May

Apart from advancing on the Ranomafana and Andohahela report from fieldwork conducted in late march and early April, the team was rather engaged with teaching activities at the university. In the second half of this month, Achille, Voahangy and Marie Jeanne organized and conducted a field school for 18 Master students of the Mention Zoology and Animal

Biodiversity, University of Antananarivo, and one student from the Lycée Français of Antananarivo in the Réserve Spéciale d'Ambohitantely. This field trip is part of the implementation of a capacity building project of Vahatra, funded by Helmsley Foundation (see above under "Current Vahatra projects and grants".)

The first few days of the month, Steve travelled to the University of La Réunion for a thesis committee meeting and

once back to Antananarivo attended another thesis committee meeting for a Comorian student at the University of Antananarivo. Also the second week of the month was a series of interviews to decide on participants for the CEPF-Durrell-Vahatra field school planned for November of this year. He was also very engaged in arranging different details for the ATBC meeting (July-August). In the middle of the month he left for his annual northern summer visit to the Field Museum.

June

Teaching activities occupied a large amount of time of Achille, Marie Jeanne, and Voahangy, as well as their regular responsibilities on supervising the advancement of graduate students, and writing or revising articles. Marie Jeanne travelled to Chicago, USA, to attend the Protected Areas Book

presentation at the Field Museum of Natural History, Chicago. She prepared a poster on the wetland bird communities of the Mahavavy-Kinkony wetlands complex in northwestern Madagascar for the 2019 Island Biology Conference (mid-July).

Steve, together with the other two editors of the protected area book, Sébastien Wohlhauser and Marie Jeanne Raherilalao,

made two different presentations at the Field Museum concerning the book: the first on 4 June to friends, donors, and members of the museum's board and on 7 June to a general audience. Olivier Langrand was also present and gave a talk at the first presentation on the history of scientific exploration of Madagascar. While in Chicago Steve had meetings with the editors of The University of Chicago Press to start organizing different aspects of the 2nd edition of *The natural history of Madagascar*. At the end of the month he attended the annual meeting of the American Society of Mammalogists, presented a plenary lecture, and received the Aldo Leopold Award for Conservation.

July

Steve returned to Madagascar at the beginning of the month and was actively involved in the last details for the organization of the ATBC meeting starting at the end of the month. All Vahatra scientists attended the III International Island Biology conference on La Réunion and the group also included several students from Vahatra and others from the national university system. Vahatra scientific members conducted a workshop for students from the region attending the island biology meeting on writing scientific papers.

Achille, Marie Jeanne, and Voahangy spent also time during the month working on the Ranomafana-Andohahela report and were involved in evaluating student abstracts for the mouse lemur symposium, which took place at the Faculty of Sciences, University of Antananarivo, at the end

of the month. Towards the middle of the month, Steve took a delegation, including some friends, to northern Madagascar for a sort of biodiversity tour and the benediction ceremony of the well Vahatra constructed at Ankarana.

The afternoon of 26 July the new book on the ants of Madagascar and published by Association Vahatra was presented. The ceremony took place at the California Academy of Science office in Antananarivo and the reception in their lovely and spacious garden.

The 56th annual meeting of the Association of Tropical Biology and Conservation commenced on 30 July and ran until 3 August. In the last portion of the month, the scientific members of Vahatra worked with students to help supervise the preparation of oral presentations and posters.

August

The first three days of the month was the continuation of the 56th annual meeting of the Association of Tropical Biology and Conservation. After this large-scale meeting, Achille, Marie Jeanne, and Voahangy continued with teaching responsibilities and Steve returned to the USA for two weeks. At the end of the month Vahatra members attended a meeting associated with the nomination of a new UNESCO biosphere reserve in the western dry forests of the island.

September

This month was an exam period at the University of Antananarivo and Achille and Marie Jeanne were rather occupied with this activity and the associated corrections. All four scientific members of Vahatra worked on different aspects of their contributions to the 2nd edition, *The natural history of Madagascar*. Voahangy and Steve, along with three Vahatra students, attended the 13thAfrican small mammal symposium in Mekelle, Ethiopia. This was also the period of intense review of the protected areas book to correct errors in light of producing a new e-book version.

Towards the end of the month, Voahangy and Steve, along with a Vahatra post-doc and two students, went to Sambava and then Marojejy to commence fieldwork associated with the Duke University project mentioned above (see National Institute of Health (NIH) and the National Science Foundation (NSF). Steve returned to Tana in early October.

October

Marie Jeanne spent a good portion of the month organizing the second session of exams at the University of Antananarivo and the associated corrections. She also was involved, with Steve, in the fieldwork in the context of invasive alien species project conducted in collaboration with Madagascar Flora and Fauna Group, which involved the supervision of two Vahatra Master's students in Toamasina. Towards the middle of the month Voahangy returned to Antananarivo from Marojejy.

Towards the middle of the month Steve went to Germany to present an invited lecture at a conference organized by the Alexander von Humboldt Foundation. His presentation was on the history of environmental change on Madagascar in recent geological time.

Achille was solicited by the Head of the Mention Biodiversity and Environment, University of Antsirabe to help reinforce different pedagogic aspects of their staff, and was in Antsirabe for a full week of teaching. He quickly returned to Antananarivo and then left for Mahajanga, where he was the invited examiner on a thesis committee. Achille and Steve were Director and Co-Director of a thesis presented at the University of Antananarivo by a Vahatra Ph.D. student.

November

Achille, Marie Jeanne, Steve, and Voahangy, organized a series of presentations at the Vahatra office in Antananarivo and field training at Ambohitantely for 12 individuals originating from the Malagasy Region (Madagascar, Mauritius and Comoros). This project aims to increase the capacity of young professionals working in different domains associated with management, monitoring and conservation of biodiversity (see "Critical Ecosystem Partnership Fund (CEPF) – regional capacity building project", above). This was the last session of a total of three in the context of this project.

During the month, in their free time, Marie Jeanne and Steve continued to reedit and correct the 2018 protected area book to produce a new version that would be converted to an e-book. Voahangy prepared a document and presentation to the Medical Ethic Committee for "Land Use in SAVA and Global Health Challenges" project in context of zoonotic disease research in collaboration with Duke University (see

National Institute of Health (NIH) and the National Science Foundation (NSF), above).

Achille took part in a thesis presentation at the University of Antananarivo. Achille worked on the revisions of the amphibian chapter for the 2nd edition of *The natural history of Madagascar* and Steve, as the principal editor of the book, was occupied with writing and editing.

December

The four scientific members of Vahatra (Achille, Steve, Voahangy and Marie Jeanne) carried out a field school with six students from the University of Antsiranana and one from the University of Antananarivo in the Réserve Spéciale d'Ankarana.

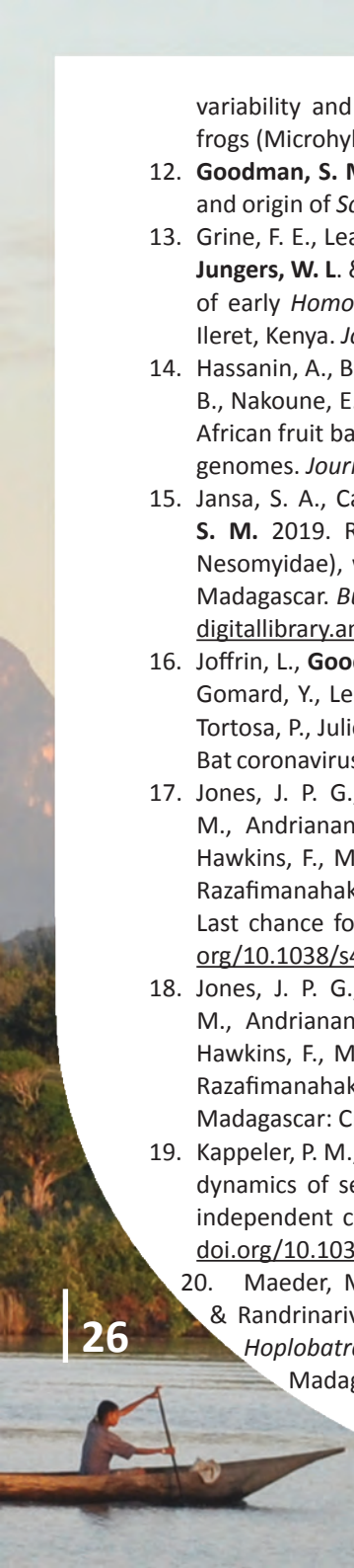
Jeanne and Steve continued to work on the revisions of the 2018 protected area book. Achille and Steve were jury members of two different Ph.D. presentations for students from the University of Antananarivo. Achille finished editing the amphibian chapter for the new natural history book and then shifted to the reptile chapter. Steve also worked extensively on writing and editing different sections of the new natural history book.

As a Comité Ad'hoc Faune et Flore-Comité d'Orientation de la Recherche Environnementale (CAAF Core) member, Achille attends regularly the monthly meeting (each first Wednesday of the month) of this platform which is in charge of the decision making for any research permit applications related to biodiversity.

SCIENTIFIC OUTPUTS OF VAHATRA DURING 2019

Publications from 2019, including in press and submitted manuscripts. Names in bold are those of scientific members and a research associate of Vahatra and those in italics are current or past (including several different generations) Malagasy student members working with Association Vahatra.

1. Apanaskevich, D. A. & **Goodman, S. M.** Submitted. Description of a new species of *Haemaphysalis* Koch, 1844 (Acari: Ixodidae) from the *H.* (*Rhipistoma*) *asiatica* subgroup, parasite of an endemic Malagasy carnivoran (family Eupleridae). *Systematic Parasitology*.
2. Burbrink, F. T., Ruane, S., Kuhn, A., Rabibisoa, N., Randriamahatantsoa, B., **Raselimanana, A. P.**, Andrianarimalala, M. S. M., Cadle, J. E., Lemmon, A. R., Lemmon, E. M., Nussbaum, R. A., Jones, L. N., Pearson, R. & Raxworthy, C. J. Submitted. The origins and diversification of the exceptionally rich gemsnakes (Colubroidea: Lamprophiidae: Pseudoxyrhophiinae) in Madagascar. *Systematic Biology*.
3. Burney, D. A., Andriamialison, H., Andrianaivoarivelo, R. A., Bourne, S., Crowley, B. E., de Boer, E. J., Godfrey, L. R., **Goodman, S. M.**, Griffiths, C., Griffiths, O., Hume, J. P., **Jungers, W. L.**, Marciniak, S., Middleton, G., Noromalala, E., Perez, V. R., Perry, G. H., Randalana R. & Wright, H. 2019. Subfossil lemur discoveries from Beanka Protected Area in western Madagascar. *Quaternary Research*, doi:10.1017/qua.2019.54
4. Carvalho, F., Brown, K. A., Gordon, A., Yesuf, G., **Raherilalao, M. J.**, **Raselimanana, A. P.**, **Soarimalala, V.** & **Goodman, S. M.** In revision. Evaluating methods for prioritizing protected areas: Incorporating expert knowledge into conservation triage using individual and aggregate rankings. *Environmental Conservation*.
5. Constant, N. L., Swanepoel, L., **Soarimalala, V.**, **Goodman, S. M.**, Taylor, P. & Belmain, S. In review. A comparative study of the characterisation, impacts and locally-adapted management strategies of rodent pests in rural Afro-Malagasy farming communities. *Journal of Environmental Management*.
6. Demos, T. C., Webala, P. W., **Goodman, S. M.**, Kerbis Peterhans, J., Bartonjo, M. & Patterson, B. D. 2019. Molecular phylogenetics of the African horseshoe bats (Chiroptera: Rhinolophidae): Expanded geographic and taxonomic sampling of the Afrotropics. *BMC Evolutionary Biology,* 19:166 https://doi.org/10.1186/s12862-019-1485-1.
7. Demos, T. C., Webala, P. W., Kerbis Peterhans, J., **Goodman, S. M.**, Bartonjo, M. & Patterson, B. D. 2019. Molecular phylogenetics of slit-faced bats (Chiroptera: Nycteridae) reveals deeply divergent African lineages. *Journal of Zoological Systematics and Evolutionary Research* DOI: 10.1111/jzs.12313.
8. Everson, K., Olson, L. E. & **Goodman, S. M.** In press. Speciation and gene flow in two sympatric small mammals from Madagascar, *Microgale fotsifotsy* and *M. soricoides* (Mammalia: Tenrecidae). *Molecular Ecology*.
9. *Faliarivola, M. L.*, Andrianarimisa, A., **Raherilalao, M. J.** & **Goodman, S. M.** In press. The diet of Malagasy dry forest understory birds based on fecal samples. *Ostrich*.
10. *Faliarivola, M. L.*, Andrianarimisa, A., **Raherilalao, M. J.** & **Goodman, S. M.** Submitted. Variation latitudinale de la faune entomologique du sous-bois des forêts sèches malgaches. *Bulletin de la Société Entomologique de France*.
11. Glaw, F., Scherz, M. D., Rakotoarison, A., Crottini, A., **Raselimanana, A. P.**, Andreone, F., Köhler, J. & Vences, M. Submitted. Genetic



variability and partial integrative revision of partially red flanked *Platypelis* frogs (Microhylidae) from eastern Madagascar. *Herpetozoa*.

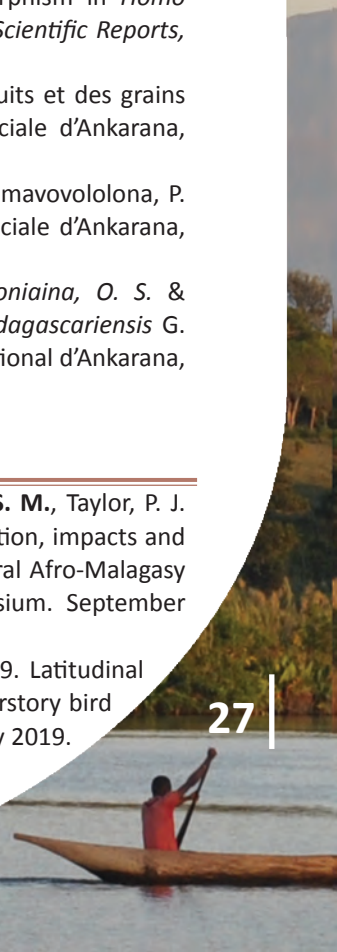
12. **Goodman, S. M.,** Fratpietro, S. & Tortosa, P. In press. Insight into the identity and origin of *Scotophilus borbonicus* (E. Geoffroy, 1803). *Acta Chiropterologica*.
13. Grine, F. E., Leakey, M. G., Gathago, P. N., Brown, F. H., Mongle, C. S., Yang, D., **Jungers, W. L**. & Leakey, L. N. 2019. Complete permanent mandibular dentition of early *Homo* from the upper Burgi Member of the Koobi Fora Formation, Ileret, Kenya. *Journal of Human Evolution*, 131: 152-175.
14. Hassanin, A., Bonillo, C., Tshikung, D., PongomboShongo, C., Pourrut, X., Kadjo, B., Nakoune, E., Vuong, T. T., Prié, V. & **Goodman, S. M.** In press. Phylogeny of African fruit bats (Chiroptera, Pteropodidae) based on complete mitochondrial genomes. *Journal of Zoological Research and Evolutionary Systematics* ().
15. Jansa, S. A., Carleton, M. D., Rakotomalala, Z., **Soarimalala, V.** & **Goodman, S. M.** 2019. Revision of the *Eliurus tanala* complex (Rodentia: Muroidea: Nesomyidae), with description of a new species from dry forests of western Madagascar. *Bulletin of the American Museum of Natural History*, 430. http://digitallibrary.amnh.org/handle/2246/6939.
16. Joffrin, L., **Goodman, S. M.**, Wilkinson, D. A., *Ramasindrazana, B*., Lagadec, E., Gomard, Y., Le Minter, G., Dos Santos, A., Schoeman, M. C., Sookhareea, R., Tortosa, P., Julienne, S., Gudo, E. S., Mavingui, P. & Lebarbenchon, C. In review. Bat coronavirus phylogeography in the western Indian Ocean. *Scientific Reports*.
17. Jones, J. P. G., Ratsimbazafy, J., Ratsifandrihamanana, A. N., Watson, J. E. M., Andrianandrasana, H. T., Cabeza, M., Cinner, J. E., **Goodman, S. M.**, Hawkins, F., Mittermeier, R. A., Rabearisoa, A. L., Sarobidy Rakotonarivo, O., Razafimanahaka, J. H., Razafimpahanana, A. R., Wilmé, L. & Wright, P. C. 2019. Last chance for Madagascar's biodiversity. *Nature Sustainability*, https://doi.org/10.1038/s41893-019-0288-0.
18. Jones, J. P. G., Ratsimbazafy, J., Ratsifandrihamanana, A. N., Watson, J. E. M., Andrianandrasana, H. T., Cabeza, M., Cinner, J. E., **Goodman, S. M.**, Hawkins, F., Mittermeier, R. A., Rabearisoa, A. L., Sarobidy Rakotonarivo, O., Razafimanahaka, J. H., Razafimpahanana, A. R., Wilmé, L. & Wright, P. C. 2019. Madagascar: Crime threatens biodiversity. *Science*, 363: 825.
19. Kappeler, P. M., Nunn, C. L., Vining, A. Q. & **Goodman, S. M.** 2019. Evolutionary dynamics of sexual size dimorphism in non-volant mammals following their independent colonization of Madagascar. *Scientific* Reports, 9: 1454 https://doi.org/10.1038/s41598-018-36246-x.
20. Maeder, M. N., Raherinjafy, R., Andriamahefa, H., *Ramasindrazana, B.* & Randrinarivolojosia, M. 2019. Absence of *Trypanosoma* infection among *Hoplobatrachus tigerinus* (Amphibia: Dicroglossidae) from Boeny, western Madagascar. *Malagasy Nature*, 13: 175-176.
21. *Noroalintseheno Lalarivoniaina, O. S.*, *Rajemison, F. I.*, *Ramanantsalama, R. V.*, Andrianarimisa, A. & **Goodman, S. M.** 2019. Population size and survival of the Malagasy fruit bat *Rousettus madagascariensis* (Pteropodidae) in Ankarana, northern Madagascar. *Acta Chiropterologica*, 21(1): 103 -113.
22. Patterson, B. D., Webala, P. W., Kerbis Peterhans, J., **Goodman, S. M.**, Bartonjo, M. & Demos, T. C. 2019. Genetic variation and relationships among Afrotropical species of *Myotis* (Chiroptera: Vespertilionidae). *Journal of Mammalogy*, DOI: 10.1093/jmammal/gyz087.
23. *Rajaonarivelo, J. A.*,**Raherilalao, M. J.**, Andrianarimisa, A. & **Goodman, S. M.** 2019. Répartition verticale des Arthropodes dans les forêts sèches occidentales malgaches. *Bulletin de La Société Zoologique de France*, 144(1), 3-39.
24. Rakotoarivelo, A., **Goodman, S. M.**, Schoeman, M. C. & Willows-Munro. 2018. Phylogeography and population genetics of the endemic Malagasy bat, *Macronycteris commersoni* s.s. (Chiroptera: Hipposideridae). *PeerJ*7: e5866 http://doi.org/10.7717/peerj.5866.
25. *Rakotozafy, L. M. S.* 2019. Population structure, activity pattern, and microhabitat use of *Phelsuma kleimmeri* at Mandrozo, Madagascar. *Malagasy Nature*, 13: 86-96.
26. *Ramanantsalama, R. V.*, *Noroalintseheno Lalarivoniaina, O. S.*, **Raselimanana, A. P.** & **Goodman, S. M.** 2019. Seasonal variation in diurnal cave roosting behavior of a Malagasy fruit bat (*Rousettus madagascariensis*, Chiroptera: Pteropodidae). *Acta Chiropterologica*, 21(1): 115-127.
27. *Ramanantsalama, R. V.*, *Noroalintseheno Lalarivoniaina, O. S.*, **Raselimanana, A. P.** & **Goodman, S. M**. Submitted. Influence of environmental parameters on the breeding of an endemic Malagasy fruit bat, *Rousettus madagascariensis* (Pteropodidae). *Acta Chiropterologica*.
28. *Randriamoria, T.* 2019. Revue des stratégies nationales sur la biosécurité et perspectives sur la gestion des espèces exotiques envahissantes à Madagascar. *Malagasy Nature*, 13: 76-87.
29. *Randriamoria, T. M.*, Rafilipo, L. A. & Fidy, J. F. S. N. 2019. Mise à jour de la distribution du crapaud commun d'Asie (*Duttaphrynus melanostictus*) dans le sud de Toamasina, Madagascar. *Malagasy Nature*, 13: 162-168.
30. *Rasoanoro, M.*, *Ramasindrazana, B.*, **Goodman, S. M.**, Rajerison, M. & Randrianarivelojosia, M. 2019. A review of *Trypanosoma* species known from Malagasy vertebrates, *Malagasy Nature*, 13: 65-75.
31. *Rasolonjatovo, S. M.*& Irwin, M. T. 2019. Exploring social dominance in wild diademed sifakas (*Propithecus diadema*): Females are dominant, but it is subtle and the benefits are not clear. *Folia Primatologica*. <https://doi.org/10.1159/000503345>.
32. *Rasolonjatovo, S. M.*, Scherz, M. D., Hutter, C. R., Glaw, F., Rakotoarison, A., Razafindraibe, J. H., **Goodman, S. M., Raselimanana, A. P**. & Vences,

M. 2020. Sympatric lineages in the *Mantidactylus ambreensis* complex of Malagasy frogs originated allopatrically rather than by in-situ speciation, *Molecular Phylogenetics and Evolution*, 144. <https://doi.org/10.1016/j.ympev.2019.106700>

33. *Rasolonjatovo, S. M.*, Scherz, M. D., Rakotoarison, A. Glos, J., Rajerison, M., **Raselimanana, A. P.** & Vences, M. Submitted. Field body temperatures in the rainforest frog *Mantidactylus* (*Brygoomantis*) bellyi from northern Madagascar. *Malagasy Nature*.
34. Ratsoavina, F. M., Scherz, M. D., Tolley, K. A., **Raselimanana, A. P.**, Glaw, F. & Vences, M. 2019. A new species of *Uroplatus* (Gekkonidae) from Ankarana National Park, Madagascar, of remarkably high genetic divergence. *Zootaxa*, 4683 (1): 084–096.
35. Ratsoavina, F. M., **Raselimanana, A. P**., Scherz, M. D., Rakotoarison, A., Razafindraibe, J. H., Glaw, F. & Vences, M. 2019. Finaritra! A new splendid leaf-tailed gecko (*Uroplatus*) species from Marojejy National Park in north-eastern Madagascar. *Zootaxa*, 4545(4): 563-577.
36. Ravelomanantsoa, N. A. F., Razafimalala, F., *Rakotomalala, Z.*, *Ranivo, J.*, Razafimanjato, G., Rene de Roland, L.-A., *Ramasindrazana, B.*, *Rakotondramanana, C. F.* & **Goodman, S. M.** 2019. Les chauves-souris du Paysage Harmonieux Protégé du Complexe Tsimembo Manambolomaty, Région Melaky, Madagascar: diversité et biogéographie. *Malagasy Nature*, 13: 105-116.
37. Razakaratrimo, S., **Goodman, S. M.**, Rene De Roland, L.-A. & Andrianarimisa, A. 2019. Caractéristiques du régime alimentaire du Milan des Chauves-souris *Macheiramphus alcinus* (Gurney, 1866) dans l'aire protégée de Mandrozo (Ouest de Madagascar). *Bulletin de la Société Zoologique de France*, 144(3: 107-119.
38. Reher, S., *Rabarison, H.*, Schoroth, M. & Dausmann, K. 2019. Seasonal movements of insectivorous bat species in southwestern Madagascar. *Malagasy Nature*, 13: 117-124.
39. **Soarimalala, V.**, Randriamanana, J. P., Razafindramasy, O. G., Oninjatovo, R. H., Razakafamantanatsoa, A., Randrianarisata, M. D. M., Benjamina, G. S., Raharinirina, D., Jao, N. M., Raharisoa, D. M., Rakotovao, F., Rafanoharana, J. & **Goodman, S. M.** 2019. Les rats dans le monde rural du Centre-est et du Centre-sud de Madagascar : dommages causes et système de contrôle. *Malagasy Nature*, 13: 125-151.
40. Stephenson, P. J., **Soarimalala, V. Goodman, S. M.**, Nicoll, M. E., Andrianjakarivelo, V., Everson, K. M., Hoffmann, M., Jenkins, P. D., Olson, L. E., *Raheriarisena, M.*, Rakotondraparany, F., Rakotondravony, D., Randrianjafy, V., Ratsifandrihamanana, N. & Taylor, P. 2019. A review of the status and conservation of Tenrecs (Mammalia: Afrotheria: Tenrecidae). *Oryx*, 1-10. https://doi:10.1017/S0030605318001205.
41. Stříbná, T., Romport, D., Vogeler, A., Tschapka, M., Benda, P., Horáček, I., Juste, J., **Goodman, S. M.** & Hulva, P. 2019. Pan-african phylogeography and palaeodistribution of rousettine fruit bats: Ecogeographic correlation with Pleistocene climate vegetation cycles. *Journal of Biogeography*, 46: 2336–2349 https://doi.org/10.1111/jbi.13651
42. Younger, J. L., Block, N. L., **Raherilalao, M. J.**, Maddox, J. D., Wacker, K. S., Kyriazis, C., **Goodman, S. M.** & Reddy, S. Submitted. Diversification of a cryptic radiation, a closer look at Madagascar's recently recognized bird family. *Systematic Biology*.
43. Vences, M., **Raselimanana, A. P.**, Rakotoarison, A., Hutter, C., Glaw, F., Razafindraibe, J. H., Scherz, M. D., *Rasolonjatovo, S. M.* & **Goodman, S. M.** 2019. Sympatric lineages in the *Mantidactylus ambreensis* complex of Malagasy frogs originated allopatrically rather than by in-situ speciation. *Molecular Phylogenetics and Evolution*.
44. Villmoare, B., Hatala, K.G. & **Jungers, W. L.** Sexual dimorphism in *Homo erectus* inferred from 1.5 Ma footprints near Ileret, Kenya. *Scientific Reports,* 9: 7687.
45. *Vololona, J.* & **Goodman, S. M.** 2019. Morphométrie des fruits et des grains de *Ficus* (Moraceae) de la forêt sèche de la Réserve Spéciale d'Ankarana, Madagascar. *Malagasy Nature*, 13: 52-59.
46. *Vololona, J.*, Ramamonjisoa, R. Z., Rasoamanana, E. N. & Ramavovololona, P. 2019. Morphologie pollinique de la flore de la Réserve Spéciale d'Ankarana, Madagascar. *Malagasy Nature*, 13: 1-51.
47. *Vololona, J.*, Ramavovololona, P., *Noroalintseheno Lalarivoniaina, O. S.* & **Goodman, S. M.** In press. Fleurs visitées par *Rousettus madagascariensis* G. Grandidier, 1928 (Chiroptera : Pteropodidae) dans le Parc National d'Ankarana, Madagascar. *Bulletin de la Société Zoologique de France*.

ORAL COMMUNICATIONS AND POSTERS

1. Constant, N. L., Swanepael, L., **Soarimalala, V.**, **Goodman, S. M.**, Taylor, P. J. & Belmain, S. 2019. A comparative study of the characterization, impacts and locally-adapted management strategies of rodent pets in rural Afro-Malagasy farming communities. 13th African Small Mammal Symposium. September 2019. Mekelle, Ethiopia.
2. *Faliarivola, M. L.*,**Goodman, S. M.** & **Raherilalao, M. J.** 2019. Latitudinal and longitudinal variation of weight of some Malagasy understory bird species. III International Conference: Island Biology 2019. July 2019. St Denis, La Réunion.



3. *Faliarivola, M. L.*, **Goodman, S. M.**, Andrianarimisa, A. & **Raherilalao, M. J.** 2019. Variation of understory bird communities in the Malagasy dry forests: Effects of anthropogenic disturbances. 56th Annual meeting of The Association for Tropical Biology and Conservation, August-September 2019, Antananarivo, Madagascar.
4. **Goodman, S. M.** 2019. The history, current status, and future of the protected areas in Madagascar.Invited plenary. 56th Annual meeting of The Association for Tropical Biology and Conservation, 30 July to 3 August 2019, Antananarivo, Madagascar.
5. **Goodman, S. M.** 2019. The history, current status, and future of the protected areas in Madagascar. Invited plenary. Third international Conference, 8-13 July 2019, St. Clotide, La Réunion, France.
6. **Goodman, S. M.** 2019. Pleistocene-Holocene environmental changes on Madagascar and associated extinctions. Invited lecture. Third international Conference, 8-13 July 2019, St. Clotide, La Réunion, France.
7. **Goodman, S. M.** 2019. A window into the recent past: The extinct animals and ecosystems of Madagascar. Invited lecture. Alexander von Humboldt, 16-19 October, Bonn, Germany.
8. Herrera, J., Wickenkamp, N., Fitzgerald R., Regula L., **Soarimalala, V., Goodman, S. M.**, Tortosa P. & Nunn C. 2019. Effects of land use, habitat characteristics, and small mammal diversity on *Leptospira* prevalence in lowland northeastern Madagascar. 56th Annual meeting of The Association for Tropical Biology and Conservation, August-September 2019, Antananarivo, Madagascar.
9. *Noroalintseheno Lalarivoniaina, O. S.*, *Ramanantsalama, R. V.* & **Goodman, S. M.** 2019. Structure and population dynamics of a local population of *Rousettus madagascariensis*. 56th Annual meeting of The Association for Tropical Biology and Conservation, August-September 2019, Antananarivo, Madagascar.
10. *Noroalintseheno Lalarivoniaina, O. S.*, Rajemison, F. I., *Ramanantsalama, R. V.*, Andrianarimisa, A. & **Goodman, S. M.** 2019. Population size and survival of the Malagasy fruit bat *Rousettus madagascariensis* (Chiroptera: Pteropodidae) in Ankarana, northern Madagascar. 13th African Small Mammal Symposium. September 2019. Mekelle, Ethiopia.
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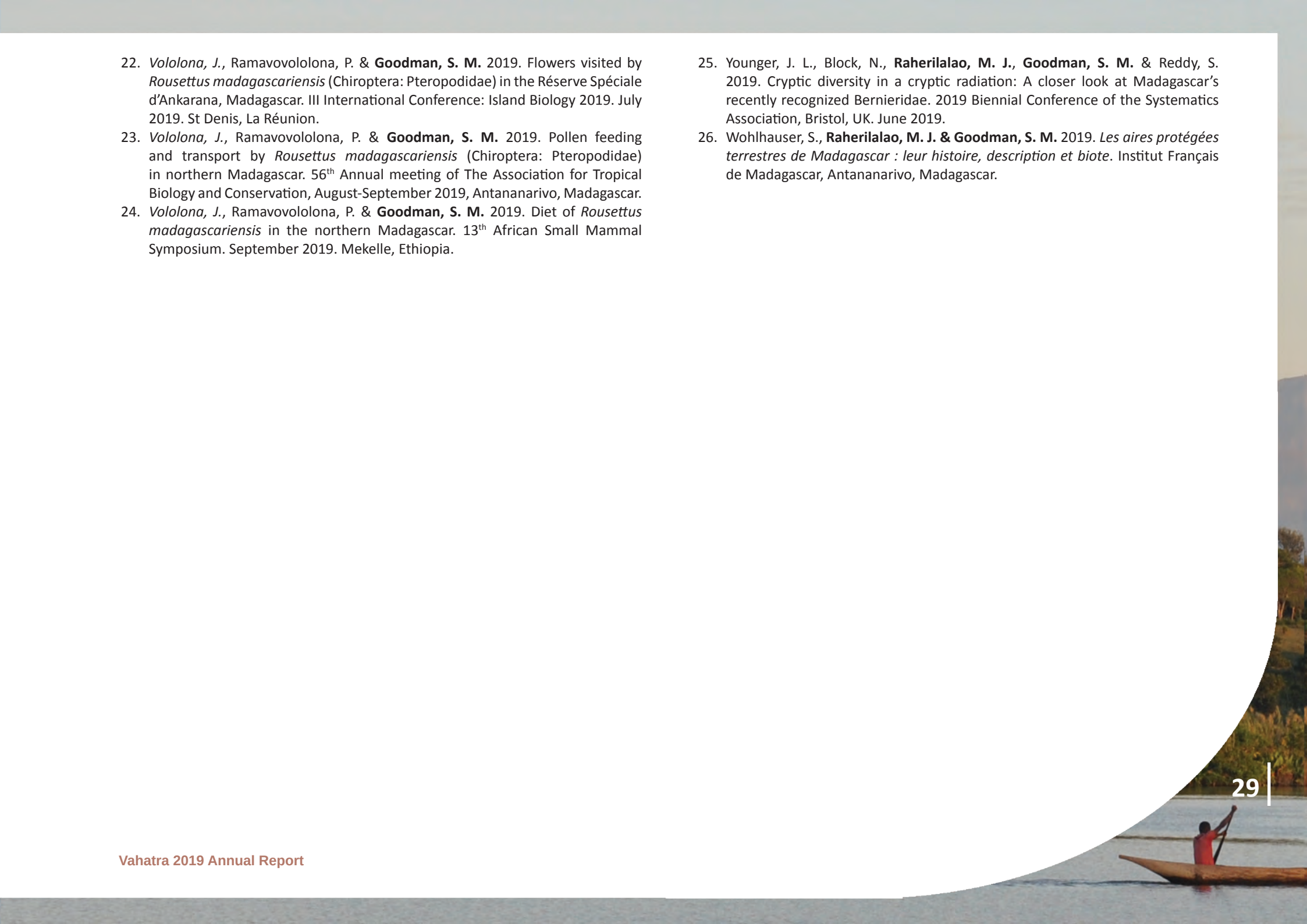

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