

ASSOCIATION VAHATRA

Annual report for 2020

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

At the start of 2020, the year held hope for different advancements and prosperity. As we often do, January was the moment to reflect on the past 12 months, to take up new challenges, and to set new goals. Unfortunately, it turned into a sort of nightmare here in Madagascar and across the world with the onset of the Covid-19 pandemic. The year 2020 will be remembered as one of anxiety and uncertainty, for some deep anguish, and one of a real survival challenge. The year has clearly shown that societies around the world are interconnected and individuals were unable to escape the impacts of the virus regardless of their social or economic status, if they are from a poor or rich country, and with few exceptions, the world as a whole has been impacted.

Here on Madagascar, tourism, which represents a significant portion of the annual national economy, severely declined due to international travel restrictions and the lack of international flights in and out of the island largely since late March 2020; as of early 2021, flights are few and overseas air travel has yet to return to regularity before the pandemic. Further, during certain periods in 2020, here on Madagascar road vehicle traffic between towns was largely halted. Finally, although Association Vahatra's research activities are planned months and even a year in advance, students and scientists have not been spared and numerous field missions and trips overseas were canceled or postponed.

Nonetheless, the long months of confinement provided an opportunity to catch up on numerous projects that have accumulated over the years. Several positive outcomes can be reported for this difficult period, such as three Ph.D. students affiliated with Vahatra being finalized and presented, as well as the submission of a new book on the natural history of Madagascar (see section in this annual report) and a range of published and submitted scientific papers. In addition, the scientific members of Vahatra were able to carry out activities for which in normal times it would have been difficult to find the needed time to complete. These include, for example, the organization and arrangement of photos taken during many years of biological inventory for the image library and that can be used for different activities and publications. Another example is the redesigning and improvement of university courses by Vahatra scientists for when life

will return to something approaching normal. Further, at the end of 2020, Vahatra was able to conduct biological exploration of the Marojejy National Park within the framework of the BIOCOM project in collaboration with UNESCO, and funded by KOICA (see section below in this annual report) and some other field projects were also implemented. Indeed, despite the anguish and uncertainty generated by the pandemic, the association was able to mark important achievements and we continue to move forward as best we can. We are always ready to rise to challenges because we understand that the future of Malagasy biodiversity is at risk and that we have considerable support from the national and international communities. With the hope that 2021 will bring a new light of hope, a breath of fresh air for all of us, and the means that each of us can carry out what needs to be done. Thank you all and we wish you the best.



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 broad vision. 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 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 their own conviction concerning 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 late Martin Nicoll, 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 finished their



higher degrees 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 different sectors. Some of 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, as well as private universities, 2) active scientific members of the Vahatra staff or eminent researchers, 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 the dissemination of information to the scientific community and the Malagasy public in general.

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 Museum 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 28 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 is retired, but still active.
2. Ms. Nanie Ratsifandrihamanana – Country Director, WWF-Madagascar.
3. General Guy Ratrimoarivony – A 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 Joelson Ratsirarison – Département des Eaux et Forêts de l'Ecole Supérieure des Sciences Agronomiques, Université d'Antananarivo and ex-Vice President of the University of Antananarivo in Charge of International Relations.
6. Mr. Jean Chrysostome Rakotoary – Ex-General Director of the Office National pour l'Environnement (ONE).
7. Professor Raelina Andriambololona – Institut National des Sciences et Techniques Nucléaires (INSTN), Université d'Antananarivo, General Director of INSTN and Member of the Malagasy Academy. He is retired, but still active.

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 following different types of higher diplomas: License, Master's II or Ph.D. degrees. The association continues to support financially some students as Post-docs. 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, as well as regional universities. In addition, Vahatra scientists 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.

Since Vahatra open its doors in late 2007, something approaching 2470 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 2020, despite the problem of Covid-19, over 50 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,

Ministry of Higher Education and Scientific Research, and 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 2020 graduate students working on Licence, Master's II, and Ph.D. degrees under the direction of Vahatra scientists, as well as those currently in preparation. After receiving their higher degrees from the university in collaboration with Association Vahatra scientists, these well-trained young researchers 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 2020 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 2020") and take their rightful place in the international scientific community.

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

1. Faliarivola, M. L. 2020. Analyse du mode de partage des niches écologiques des oiseaux du sous-bois des forêts sèches de Madagascar. Thèse de Doctorat. Faculté des Sciences, Université d'Antananarivo, Antananarivo.
2. Rajaonarivelo, J. A. 2020. Implication des facteurs écologiques sur la stratification verticale des oiseaux dans les forêts sèches caducifoliées occidentales malgaches. Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.
3. Vololona, J. 2020. Etude des interactions entre *Rousettus madagascariensis* G. Grandidier 1928, (Chiroptera : Pteropodidae) et les plantes à fleurs de la Réserve Spéciale d'Ankarana par des analyses polliniques. Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.



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

1. Ameliad, H. 2020. Ecologie et priorité de conservation des vertébrés terrestres d'Anjouan (Union des Comores). Thèse de Doctorat, Sciences Agronomiques et Environnementales, Université d'Antananarivo.
2. Andrianarimalala, S. M. 2020. Distribution écologique et biogéographie des Opluridés dans le Grand Sud de Madagascar. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
3. Andrianarimisa, M. 2020. Mise au point des techniques d'échantillonnage de *Corethrella* spp. (Insecta : Diptera : Corethrellidae), moucheron ectoparasites d'amphibiens, dans quatre Aires Protégées de Madagascar. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
4. Moir, M. I. 2020. Bat community structure of forests in the Eastern Cape. Ph.D. thesis, The University of Stellenbosch.
5. Moussa, M. 2020. Projet de renforcement de la protection de l'environnement pour le développement local : cas des organismes internationaux. Mémoire de projet de fin d'études. Ecole Nationale de l'Administration de Madagascar. Antananarivo.
6. Raharimandimby, P. H. F. 2020. Etude comportementale et relationnelle entre les pères et leurs bébés *Propithecus verreauxi* (Grandidier, 1987) dans la forêt de Kirindy CNFEREF, Morondava, Madagascar. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.

7. Randriamahafaly, M. 2020. Mode de partage de champ d'alimentation chez *Indri indri* (Gmelin, 1789) de la forêt d'Anjahamana du corridor Ankeniheny-Zahamena, Est de Madagascar. 2020. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
8. Randriamiharisoa, I. O. 2020. Stratégie d'adaptation et d'utilisation du milieu urbain d'Antananarivo, Madagascar par le Martin triste (*Acridotheres tristis*, Linnaeus 1788). Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.
9. Ramahandrizafy, S. K. 2020. Socio-écologie des femelles de *Microcebus murinus* (Muller, 1777) pendant la prise de soin des progénitures dans la forêt de Kirindy CNFEREF, Morondava II. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
10. Razakaratriho, S. V. J. 2020. Population, biologie de la reproduction, écologie et conservation du Milan des chauves-souris *Macheiramphus alcinus anderssoni* (Gurney, 1866), dans l'ouest de Madagascar. Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.
11. Safidiharizo, A. P. 2020. 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.

C) Licence, Master's, Ph.D., and HDR diplomas in preparation in direct collaboration with scientific members of the Associated Vahatra

1. Andriamihanta, L. In preparation. Contribution à l'étude d'impact des feux de brousse sur la population de *Furcifer oustaleti* dans le Parc National d'Isalo. Mémoire de Licence, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.
2. Rabearivony, J. In preparation. Caméléons : Indicateurs environnementaux, outils de la conservation. Habilité à Diriger des Recherches (HDR), Facultés des Sciences, Université d'Antananarivo.
3. Rabekoronana, S. V. In preparation. Contribution à l'étude des impacts du feu sur la population de *Coua cristata* dans la zone de protection Beraketa Malio, Parc National Isalo. Mémoire de Licence, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.
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. Rafanomezantsoa, N. F. In preparation. Contribution à la connaissance des impacts du feu de brousse sur *Lemur catta* dans le Parc National Isalo. Mémoire de Licence, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.

6. Raherilalao, M. J. In preparation. Concilier la recherche, le renforcement de capacité et l'appui à la gestion et la conservation de la biodiversité : aperçu via l'évaluation éco-biologique des oiseaux malgaches. Mémoire d'Habilitation à Diriger des Recherches, Faculté des Sciences, Université d'Antananarivo.
7. Raherisoa, M. N. A. In preparation. Contribution à l'étude de la population et l'habitat de *Tachybaptus pelzelni* à Andilana Atsimo, Lac Alaotra. Mémoire de Licence, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.
8. 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.
9. Raobson Hanitrondrasana, E. In preparation. Distribution et statut de la population des corbeaux familiers (*Corvus splendens*, Corvidae) dans les villes portuaires de Madagascar. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
10. Raolihanintrasinga, S. E. In preparation. Etude de la biologie et du régime alimentaire de l'oiseau invasif, *Passer domesticus* (Ploceidae) dans la ville de Toamasina, Madagascar. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
11. Rasambahita, I. L. In preparation. Contribution à l'étude du comportement et des habitats de *Propithecus verreauxi* en vue de la réintroduction dans le site Namaza, Parc National Isalo. Mémoire de Licence, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.
12. 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.
13. Rasoarimanana, R. T. In preparation. Structure et distribution écologique de la communauté herpétofaunique du Parc National de Marojejy, Nord-Est de Madagascar. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
14. Rasolonjatovo, H. A. M. In preparation. Histoire, taphonomie, et paléoécologie des oiseaux subfossiles du Parc National de Tsimanampesotse, Sud-ouest de Madagascar. Thèse de Doctorat, Faculté des Sciences, Université d'Antananarivo.
15. 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.
16. Razafimanantsoa, S. T. M. I. In preparation. Effet de versants sur les communautés d'oiseaux de quelques massifs forestiers malgaches. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.

17. Razafimandimby, J. L. In preparation. Structure de la communauté de petits mammifères du Parc National de Marojejy. Mémoire de Master, Mention Zoologie et Biodiversité Animale, Université d'Antananarivo.
18. Razafindrazaka, D. F. A. In preparation. Contribution à l'étude de la population et préférence en habitat de *Monticola sharpei* dans la forêt d'Andranonombilahy, Parc National Isalo. Mémoire de Licence, Institut des Sciences et Techniques de l'Environnement, Université de Fianarantsoa.
19. Robsonmanitrondrasana, 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.
20. Todilahy, L. J. In preparation. Régime alimentaire et structure sociale de *Mops leucostigma* (Chiroptera : Molossidae), durant la saison humide au sein de la station forestière d'Ivoloina, région Atsinanana. Mémoire de Master, Mention Zoologie et Biodiversité Animale, 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 2020 as reviewers for papers submitted to the following international journals:

- *Acta Chiropterologica*
- *African Journal of Ecology*
- *Biological Journal of the Linnean Society*
- *Endangered Species Research*
- *Global Ecology and Conservation*
- *Journal of Mammalogy*
- *Malagasy Nature*
- *Mammalia*
- *Molecular Ecology*
- *Molecular Phylogenetics and Evolution*
- *Proceedings of the Royal Society B*
- *Science Advances*
- *Tropical Zoology*
- *Zoosystematics and Evolution*

MALAGASY NATURE

Our intention with the scientific journal *Malagasy Nature*, which is published by Association Vahatra, is to advance peer-reviewed papers at high scientific and technical standards. As the review has an International Standard Serial Number (ISSN) number, it is classified as 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 the editorial staff of *Malagasy Nature* provides the means for these less experienced scientists 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 at the same levels with initial manuscript submission and revisions. Further, the journal allows Malagasy scientists to return information to the worldwide scientific world. All of these aspects together, 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. As a further point of explication, several researchers preparing their theses or professors working on their HDR diplomas, submit articles to *Malagasy Nature* as they understand that when needed or appropriate they will get assistance from the editorial team to improve their manuscripts. The manner the journal is published on-line 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 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 assist in different aspects with submitted manuscripts. 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:

Editors

Marie Jeanne Raheirilalao
Steven M. Goodman

Associated editors

Achille P. Raselimanana
Malalarisoa Razafimpahanana
Voahangy Soarimalala

Editorial committee

Birds

Frank Hawkins
Olivier Langrand

Mammals

Jean-Marc Duplantier
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Manuel Ruedi

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Franco Andreone
Miguel Vences

Crustaceans/Fish

Jeanne Rasamy
Melanie Stiassny

Parasitology

Vincent Robert

Plants

Christopher Birkinshaw
Roger Edmond
Joelisoa Ratsirarson

History/Archeology

Chantal Radimilahy
Henry Wright

Paleontology

David Burney
John Flynn

A regular issue of the journal, Volume 14, was published in late 2020 and all pdf versions are downloadable at <http://www.vahatra.mg/volume14fr.html>. The 2020 volume includes the following papers:

Malagasy Nature

Volume 14 - 2020



Volume 14 (2020)

- **Tribute to Martin Edwin Nicoll (1954-2020): Forty years (1980-2020) of a British scientist dedicated to the conservation of Malagasy biodiversity** – Olivier Langrand.
- **Effet de l'exploitation minière sur les facteurs productifs comme l'agriculture et la production de charbon de bois et la dynamique de déforestation dans le Sud-ouest de Madagascar** – Camille A. Tovondrazane, Bin I. Holède, Ricardo R. Andriatsiaronandroy, Thierry Razanakoto & Zo Rabemananjara.
- **Etude dendrométrique et dendrochronologique de trois espèces de *Cedrelopsis Baillon*, (Rutaceae) dans les forêts sèches de l'Ouest de Madagascar** – Rota Ravaoherinavalona, Edmond Roger, Bakolimalala Rakouth & Bako Harisoa Ravaomanalina.
- **Resting site choice depends on age in *Opisthacanthus madagascariensis* (Scorpiones: Hormuridae) in dry deciduous forest, western Madagascar** – Michał Walesiak.
- **A rapid avifaunal survey of the Mahimborondro Protected Area, northern Madagascar** – John C. Mittermeier, Dale R. Wright, Benjara Armand, Robin Colyn, Brett Gardner, Merlijn Jocque, Luke Kemp, Angelinah Rene de Roland, Dan Sloomakers & Lily-Arison Rene de Roland.
- **Field body temperatures in the rainforest frog *Mantidactylus (Brygoomantis) bellyi* from northern Madagascar: Variance and predictors** – Safidy M. Rasolonjatovo, Mark D. Scherz, Andolalao Rakotoarison, Julian Glos, Achille P. Raselimanana & Miguel Vences.
- **Population dynamics of *Lemur catta* at selected sleeping sites of Tsimanampesotse National Park** – Charles Kasola, Florent Atrefony, Fisy Louis, Germany Nicolas Odilon, Romialde Gabriel Ralahinirina, Tahina Menjanahary & Yedidya R. Ratovonamana.

Notes

- **Canopy chameleon (*Furcifer willsii*) consumption by common big-eyed snake (*Mimophis mahfalensis*) in Fivahona Forest, eastern Madagascar** – Javier Lobón-Rovira, Francesco Belluardo, Malaladiana Rasoazanany, Gonçalo M. Rosa & Angelica Crottini.
- **First sighting of the House Crow *Corvus splendens* on Nosy Be** – Gilbert Razafimanjato, Marius Razafimahatratra & Lily-Arison Rene de Roland.

The next issue of *Malagasy Nature* will be a monograph dedicated to advances in paleontological and archaeological research on Madagascar, with a focus of projects led by national students and researchers, and scheduled for publication in the second half of 2021.

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 grew 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 perceive the importance of the natural world. It is not an exaggeration to state that these types 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 world’s principal tropical conservation priorities, the largely 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 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 gift from the Ellis Goodman Family Foundation (not at all related with Steve Goodman) allowed additional guides in the series to

be published. We plan to continue the series and the next to appear and graciously subsidized by the Ellis Goodman Family Foundation and Paul Goodman includes:

Libellules et demoiselles de Madagascar et des Iles de l'Océan Indien occidentale / Dragonflies and Damselflies of Madagascar and the western Indian Ocean Islands (a bilingual French-English book) by K. D. Dijkstra & Callen Cohen.

This book was anticipated in late 2020, but due to Covid-19 pandemic, it has been delayed, is now close to the final stages of preparation, and is scheduled for publication in the first half of 2021.

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 responsible for the distribution of Vahatra books (see http://www.press.uchicago.edu/ucp/books/publisher/pu3431914_3431915.html) in the New World and Europe, which also include 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.

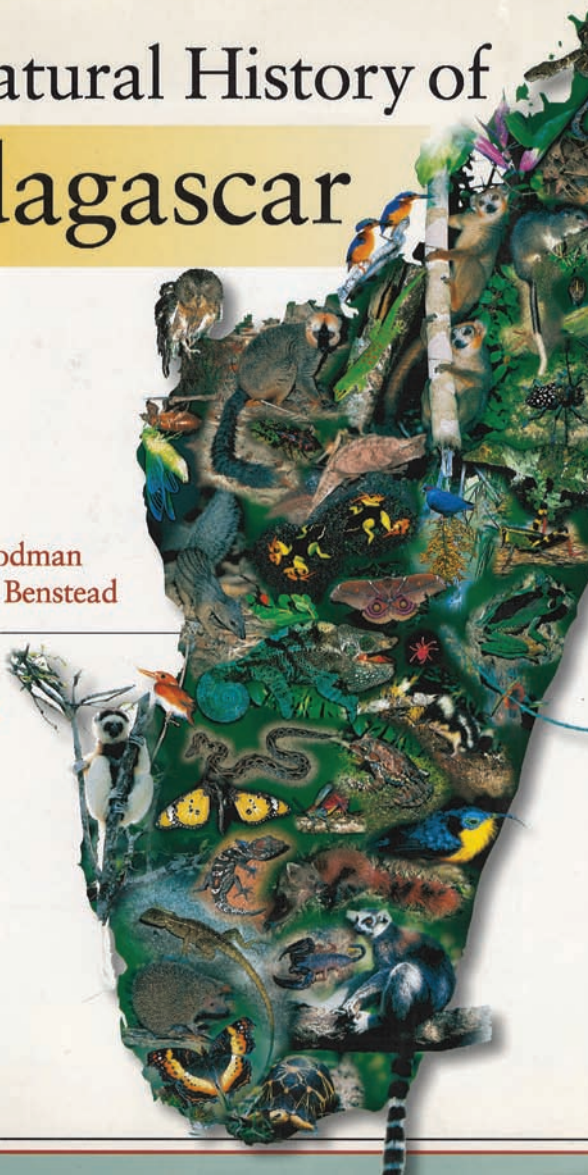
THE NEW NATURAL HISTORY OF MADAGASCAR

In 2003, Steve Goodman and Jonathan P. Benstead (University of Georgia), published a +1700 page volume entitled *The Natural History of Madagascar* (University of Chicago Press). Steve was first editor and principal contributor to the volume, which was widely praised—e.g., *Science* called it “a scientific milestone and by far the largest synthesis of tropical biology research ever.” Now fast forward nearly two decades later and since the 2003 book appeared, the amount of information on the natural history of Madagascar, as defined in the broad Victorian sense of the word, has expanded at a rate beyond the most enthusiastic expectations. Advances made on research and conservation fronts concerning Madagascar

The Natural History of Madagascar

Edited by
Steven M. Goodman
& Jonathan P. Benstead

Photographs by
Harald Schütz



during that time easily surpassed that of the 20 years preceding that volume's publication. With all of this in mind, Steve, as the principal editor, joined by 17 subject editors, decided to redo the 2003 book. The new volume was submitted to Princeton University Press the second week of 2021 and will be published under the title *The New Natural History of Madagascar*. The manuscript came in at just under 7,000 pages, including 553 figures and 243 tables, and has 279 contributions from 539 contributors, of which about one-third are Malagasy. The book should appear in the first portion of 2022 in two separate volumes of an estimated 1250 pages each.

CURRENT VAHATRA PROJECTS AND GRANTS

Critical Ecosystem Partnership Fund (CEPF) – e-book on the protected areas of Madagascar and other user tools

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 bilingual French-English book entitled “Terrestrial protected areas of Madagascar: Their history, description and biota” was published by Association Vahatra in March 2019. On the basis of an additional grant given





to Strand Life Science (Bangalore, India) from CEPF, with Association Vahatra as a partner, an e-book version of a revised and corrected version of the protected area book is nearly finished and will be available in March 2021. The three printed volumes of the protected area book are cumbersome to say the least, weighing close to 7 kg, and the e-book version will facilitate utilization. Further, to simplify usage and be more user-friendly, separate e-books have been prepared for the French and English language versions.

Other aspects of this project include the creation of a website with lots of different details on the 98 terrestrial protected areas of Madagascar covered in the book, including up-to-date species lists of vertebrates known from each site, as well as the means for citizen scientists and naturalists to update the downloadable species lists. Based on a day-seminar presentation in Antananarivo by Thomas Vattakaven and Prabhakar Rajagopal of Strand Life Science and different members of Association Vahatra to potential users of the site, important input was received on aspects that would facilitate site organization. These details are being incorporated into the construction of the site, which will be on-line in 2021. Another important aspect of this grant project is uploading on to a cloud and providing free access to about 8000 pdf files used in writing the book, which include a range of different types of publications, unpublished reports, previously unavailable DEA and Master's memoirs, Ph.D. theses, and other types of diploma documents from the Malagasy university system.

Critical Ecosystem Partnership Fund (CEPF)/Madagascar Faunal Group/Vahatra – 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 other partners received a grant to eradicate the recently introduced and highly invasive Indian House Crow (*Corvus splendens*) in the Toamasina area, central eastern coast of Madagascar. 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 for the eradication of the Indian House Crow and Vahatra's interventions focus 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 three Master's students from the University of Antananarivo, which will be present in early 2021, and field projects of Vahatra scientists. These include studies on the presence and absence of Indian House Crows in all major ports on the island and population estimates, and the breeding biology and dietary regime of House Sparrows in the city of Toamasina. Projects on zoonotic diseases are in collaboration with the Mahaliana molecular laboratory in Antananarivo.



Duke University/National Institute of Health (NIH) and the National Science Foundation (NSF) – land use in SAVA and global health challenges

This project is based on 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 large-scale project aims to understand the linkages between diseases circulating across a habitat mosaic of native forest, agricultural areas, and in the near vicinity of villages and for which endemic and introduced animals may act as reservoirs and the source of 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. Toky Randriamoria, a post-doc in the context of the project, is responsible for the field sampling and seconded by Voahangy and Steve. A new assistant, Fifaliantsoa Rasolobera has been engaged to reinforce the field team. Field camps have an array of solar panels to provide the needed energy to run refrigerators and keep samples at the required low temperatures. In collaboration with Charles Nunn, Duke University, who is the Principal Investigator, the research project intends to study novel methods to predict disease spread, with zoonotic and different forms of infectious diseases being an important human health threat on Madagascar. Two Vahatra 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 that will be presented on March.

KOICA/UNESCO/Madagascar National Parks/Association Vahatra

- The moist evergreen forests of the eastern region of Madagascar are home to an exceptional diversity of plants and animals and



these ecosystems play a fundamental role in maintaining biodiversity and ecological processes. Their integration some years back within UNESCO's network of World Heritage Sites was a crucial step in supporting efforts to preserve their Outstanding Universal Values (OUV). Unfortunately, these 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 acquire new agricultural lands. The integrity of the biological diversity of these protected areas and their OUV have been seriously threatened. The magnitude of the situation was such that UNESCO's World Heritage Committee decided to classify in 2010 "The Rainforest of the *Atsinanana*" in the list of World Heritage "In Danger". The purpose of this project financed at the level of several million US dollars by Korea International Cooperation Agency (KOICA) is to rectify the situation through several different approaches: economic development, public education, and studies of the regional biota.

The role of Association Vahatra in the project is to examine patterns of biotic diversity at the focal sites through biological inventories. Further, as Vahatra scientists and students previously surveyed these sites some 15



years ago, comparisons of possible change through time can be made, and if such changes have taken place, to determine the probable causal reasons. Finally, with the biodiversity data across nearly 20 years, it will be possible to strengthen protection of the sites and better understanding different pressures. Another aspect is to install a system of ecological monitoring sites and automated meteorological stations to provide measures of climate change in the future. In the context of this KOICA project, other than the “The Rainforest of the *Atsinanana*” the Vahatra field team is also engaged to conduct an eco-biological evaluation of dry forest in the far north at Montagne de Français.

FEDER/University of La Reunion/PIMIT/Vahatra. Diversity and transmission dynamics of infectious agents in Malagasy bats -

The scientific objectives of this project are to characterize the diversity of infectious agents circulating in populations of bats in northern Madagascar and to study the temporal dynamics of transmission, particularly within breeding and day-roosting colonies. Funding is based on a grant from the Fonds européen de développement régional (FEDER). The study in collaboration with Dr. Camille Lebarbenchon from the Processus Infectieux en Milieu Insulaire Tropical (PIMIT) laboratory and associated with the University of La Reunion, and with a Malagasy post-doc, Riana Ramanantsalama, who did his Ph.D. thesis with Vahatra, is based on the capture/release of bats and the collection of material for laboratory analysis. For each captured animal, samples include an oral swab to collect saliva, a rectal swab to collect feces and other microorganisms in the hindgut, and ectoparasites. It is planned that each study colony, including caves in Ankarana and synanthropic roost sites in buildings in the nearby town of Ambilobe, to be visited every 3-4 months in order to study seasonal shifts in the temporal dynamics of infection at the population level. Individuals of the fruit bat *Rousettus madagascariensis* (family Pteropodidae) living in the caves of Ankarana are marked with uniquely numbered rings in order to study infection dynamics at the level of individuals. With the lockdown of 2020, only two visits were conducted to the study sites and it is our hope that by the start of the second quarter of 2021 we will be able to visit the study sites with the planned frequency.

MEETINGS AND CONFERENCES IN 2020 ATTENDED BY ASSOCIATION VAHATRA

During 2020 associated with COVID-19 restrictions, no students or scientific members of Vahatra were able to attend in person overseas scientific meetings. Some members of Vahatra took part in virtual meetings. For example, Lova Marline, a post-doc at Association Vahatra (see below), organized a virtual seminar highlighting research on Madagascar in the context of the International Humboldt day and specifically focusing on island biogeography. Two keynote speakers took part, one in the USA and another in South Africa, as well as five presentations by Malagasy graduate students.

PERSON IN FOCUS: LOVANOMENJANAHARY MARLINE OR “LOVA”

After finishing her Ph.D. at the University of Cape Town in 2018 on the diversity and biogeography of Malagasy bryophytes on the Marojejy Massif in the north, Lova “returned home” and started her post-doctoral studies in August 2020. Before leaving for South Africa, she completed her Master’s degree in the Département de Biologie et Ecologie Végétale, Université d’Antananarivo. With her local post-doc base being Association Vahatra and also collaborating with Kew Madagascar Conservation Centre, she will continue her exploration of Madagascar at a series of sites with unknown or poorly known bryophyte floras. Using data on the local bryophytes from montane regions of Madagascar, she will be able to examine some of her broad interests on the ecological and evolutionary processes that determine community assembly and biodiversity pattern at local, landscape, and broader biogeographic scales. Further, bryophytes are presumed to be an excellent group to understand the effect of climate change on biodiversity. Lova’s post-doc is for two years and based on grants she has obtained from National Geographic Society, Royal Botanical Garden (Kew), and Deutscher Akademischer Austauschdienst (DAAD).



DISCUSSIONS WITH MONSIEUR JEAN-YVES LE DRIAN, FRENCH MINISTER OF EUROPE AND FOREIGN AFFAIRS

At the request of the Minister during a visit to Madagascar in late February, a meeting was organized by the French Embassy in Antananarivo to discuss with individuals working in the private sector some critical questions concerning the advancement of conservation programs on Madagascar. Claude-Anne Gauthier, the national representative of the Institut de Recherche pour le Développement, invited Steve Goodman to take part in the meeting. The questions revolve around several themes: 1) the urgency in the overall preservation of the environment and biodiversity, 2) do local

public policies respond to the needs, and 3) how to remedy the shortcomings identified.



WITH A SPECIAL THANKS

We would like to give a special thanks to a number of individuals that have financially supported different Vahatra activities in 2020, including the advancement of Malagasy graduate students and a range of other activities, such as the publication of *The new natural history of Madagascar*. The list is ordered alphabetically by family name:

- Joyce Chelberg
- Ellis Goodman Family Foundation
- Paul Goodman
- Mary Ann and Owen Griffiths
- Bob and Gail Loveman
- Michael and Tanya Polsky
- Bob and Charlene Shaw
- Adelle Simmons

ACTIVITIES OF VAHATRA PERMANENT MEMBERS DURING 2020

Members of the Vahatra scientific staff were involved in a variety of activities, which are summarized below by month.

January

During this month, Marie Jeanne was occupied with coursework at the university and helped supervise the Ph.D. thesis of Arline Rajaonarivelo. Voahangy spent portions of January on different university related activities and responsibilities including the supervision of the memoir of a student at the Ecole Nationale d'Administration de Madagascar. Achille continue working on the herpetofaunal sections for *The new natural history of Madagascar*, including reference verification. He was the internal university reader of a Ph.D. student. Steve spent a portion of the first portion of the month in the Toamasina area helping a Vahatra Master's student set up his research program on the ecology and diet of a bat species living in buildings and in the middle portion of the month left for Ankarana and Ambilobe for sampling bats for zoonotic diseases in the context of a FEDER project (see above). When possible, he concentrated his efforts on editing and writing the new natural history book, as well as commenting on the thesis of Arline Rajaonarivelo mentioned above.

February

Marie Jeanne helped edit the Ph.D. thesis of Manoa Faliarivola, as well as being involved in exams at the University of Antananarivo. Voahangy undertook the organization of logistic and administration aspects for upcoming fieldwork at Marojejy associated with Duke University project (see above). She also continued with different university activities and responsibilities. One of the Ph.D. students of Vahatra, Judith Vololona, defended her thesis and Steve and Achille are among the jury members. Furthermore, Achille participated as a committee member for two Ph.D. students from the Agronomy School and another from the Entomology Department, University of Antananarivo. He was solicited by the University of Antsirabe Vakinankaratra-Biodiversity and Environment Management Department to give a course on ecomorphology and biomechanics and spent some time to elaborate the associated module. Steve continued to

concentrate his efforts on editing *The new natural history of Madagascar* and at the end of the month gave two presentations in Antananarivo to students working in Madagascar from the School of International Training (SIT). He also met with the Minister of the Environment to discuss several new projects.

All four scientific members of Vahatra and Madame Sabrina Raharinirina work actively to organize a workshop on the protected areas of Madagascar book portal and website project with Strand Life Science (Bangalore, India) and financed by the Critical Ecosystem Partnership Fund (see above). During this month, Voahangy assisted a meeting at Madagascar Biodiversity Partnership as a board member and, together with Achille, she took part in a meeting at Madagascar National Parks as a committee member of the Resilience Climatic project.

March

Towards the beginning of the month, Voahangy along with a Vahatra post-doc and one Ph.D. student, went to Sambava and then to Marojejy for fieldwork associated with the Duke University research project (see Duke project mentioned above). She returned to Tana in mid-March and continued with university activities. Towards the beginning of the month, Achille participated actively in the initial meetings in the creation of a national ethic committee associated with animal research. As he was already a member of such a committee associated with the Institut Pasteur de Madagascar, he could share some experiences on the functional and operational mechanism of such committees. He took part as the president of two Master's presentation at the University of Antananarivo. Steve continued to concentrate his efforts on editing *The new natural history of Madagascar*. In the early portion of the month he went to La Reunion island to take part in a meeting of a Ph.D. student; he returned to Madagascar on one of the last flights into the country before Covid-19 lockdown. He also was a jury member for two Ph.D. theses presented at The University of Antananarivo.

During the latter portion of the month associated with the COVID-19 pandemic, a general lockdown was imposed in Antananarivo, and Marie Jeanne worked from home and mostly on her HDR memoir. Achille, Voahangy, and Steve were able to continue working from the Vahatra office, of course taking the needed precautions, but the office was generally closed to students.

April

With the burden of the COVID-19 lockdown on all, this was a month to work attentively on different in-town projects. Marie Jeanne continued to write her HDR memoir. Voahangy was occupied with working on a contribution to *The new natural history of Madagascar* and continued teaching online. Achille was occupied working on a scientific manuscript and he commented on a Master's memoir of a Vahatra student. Several Ph.D. theses and Master's memoirs planned to be presented this month, including Vahatra students, were cancelled because of lockdown. Steve worked diligently on editing and writing the new natural history book and several manuscripts.

May

As in the previous month, with the COVID-19 lockdown still in place this was a period of different office related projects. Marie Jeanne spent most of the month preparing two new courses. Voahangy was occupied with work on a contribution for *The new natural history of Madagascar* and the preparation of an online exam for university students. Achille spent most of the month to identify, arrange, and classify his large collection of amphibian and reptile photos taken during many years of biological inventories across Madagascar. He also commented on a HDR memoir. Steve continued to work on editing and writing the new natural history book and several manuscripts.

June

As in the previous two months, based on COVID-19 lockdown measures, the majority of Vahatra field activities were postponed and the office remained largely closed. After receiving comments from her supervisor, Jeanne continued to work on her HDR memoir, as well as preparing new courses. Voahangy was busy organizing the logistics and administration aspects of fieldwork in Marojejy area associated with the Duke project (see above) and the field team received special permission to travel by road to Sambava and then on to Marojejy associated with the COVID-19 precautions. She continued with different university activities and responsibilities. Voahangy, Achille, and Sabrina were active with organizing the final document for a new project titled "Biodiversity Conservation and Sustainable Natural Resource Management for Integrated Community Development in National Parks of Madagascar" and to be financed by Korea International Cooperation Agency (KOICA). Achille continue working on his herpetofaunal photo

collection and on different scientific articles as a coauthor or reviewer. Steve persisted to work on *The new natural history of Madagascar*.

July

Covid-19 lockdown measures were still in place for Antananarivo and road traffic to certain other major cities in the country were largely restricted with the exception of with special permits. Marie Jeanne and Steve edited articles for volume 14 of *Malagasy Nature*. Voahangy actively advanced a request to the national ethics committee for research permission for the Duke project at Marojejy. Achille divided his time mostly between refining his new course on biomechanics and commenting of an HDR memoir and two Ph.D. theses, as well as virtual interactions with other Ph.D. students. Steve continued to work on *The new natural history of Madagascar*.

August

Covid-19 lockdown measures still in place for Antananarivo and road traffic to certain other major cities in the country requiring special permits. Marie Jeanne and Voahangy worked on revisions to contributions for *The new natural history of Madagascar*, as well as different university activities and responsibilities. Achille and Steve maintained largely the same activities as during the month of July.

September

Covid-19 lockdown measures still in place for Antananarivo and road traffic to certain major cities in the country, particularly the north, highly restricted. Some national flights for air service from Tana to certain cities on the island recommenced, but with COVID testing procedures. Marie Jeanne and Steve continued on editing manuscripts for the next volume of *Malagasy Nature*, as well as working on different contributions for *The new natural history of Madagascar*. Steve went to the north together with Riana Ramanantsalama, the post-doc engaged in the context of the FEDER bat virus project (see above), for capturing and swabbing animals roosting in caves (Ankarana) and in human structures (Ambilobe). They had special permits from the COVID committee for road travel. In the context of the Duke project, Voahangy was involved in a scouting mission for a new site along the western slopes of the Marojejy Massif. Achille worked with a Ph.D. student on field protocols to study a rare species of chameleon (*Calumma tarzan*) and presided over

the presentation of two Master's students at The University of Antananarivo. As part of the preparation of an upcoming inventory of Marojejy National Park, Achille prepared an illustrated herpetofaunal guide to the site to help students for species identification in the field.

October

The health emergency on Madagascar associated with the COVID-19 pandemic was partially lifted in the middle of the month. Marie Jeanne and Steve continued to edit manuscripts for the next volume of *Malagasy Nature*, several of which were sent for typesetting. These two individuals were also involved in the final details for the thesis presentation of two Vahatra Ph.D. students at The University of Antananarivo, Arline Rajaonarivelo and Manoa Faliarivola, which had been delayed for months because of the crisis, and together with Achille served on the associated juries; special restrictions were in place with respect to limiting the number of participants and distance measures. Voahangy was busy organizing the logistic and administration aspects for fieldwork in the context of the Duke University project on the southwestern slopes of Marojejy, at a new site known as Sarahandrano, and the team left Antananarivo by road in mid-October. She was also occupied in developing subjects for students following the Licence degree program at The University of Fianarantsoa. As activities at the University of Antananarivo were resumed, including exams, Achille spent some his time grading exams. Steve continued to work on *The new natural history of Madagascar*.

November

Things start to open up concerning COVID-19 restrictions on Madagascar. Voahangy and Marie Jeanne prepared different aspects for the first field season of fieldwork associated with the KOICA funded project, with the first site being Marojejy National Park in the north. Achille, Marie Jeanne, and Voahangy, together with three Master's students and a primatologist, left Antananarivo at the beginning of November for a month mission to the site. Steve continued to work on *The new natural history of Madagascar*, which is approaching completion. The November field trip to Ankarana of Steve in the context of the FEDER bat project was postponed, as Riana Ramanantsalama, the project post-doc based on La Reunion, was unable

to travel to Madagascar because of suspended air flights between the two islands, associated with a new wave of COVID-19 cases in France.

December

After the KOICA mission to Marojejy in the north, most of the Vahatra team arrived in Antananarivo on 10 December, although Voahangy went to the Duke Project site at Sarahandrano and on the same massif for a field visit. For the balance of the month, Achille, Voahangy, and Marie Jeanne were intensively involved in data analysis and writing up results from the KOICA field investigations. Steve and Marie Jeanne did the last checking of page proofs for volume 14 of *Malagasy Nature*, which was posted on line (<http://www.vahatra.mg/volume14fr.html>) before the end of the month. Steve also completed the last stages of *The new natural history of Madagascar*, which was sent to Princeton University Press after the holidays.

VAHATRA SCIENTISTS PART IN THE GOVERNING OF SCIENTIFIC RESEARCH ON MADAGASCAR

A special committee has been reestablished by the Malagasy Government that evaluates research permit requests based on proposals submitted by national and international researchers for work on Malagasy biodiversity. This committee known as Commission ad'hoc Faune et Flore/Comité d'Orientation de la Recherche Environnementale (or CAAF/CORE) holds monthly meetings to evaluate incoming research proposals. Achille and Voahangy take an active role in the committee evaluations of proposals. The Malagasy Government has obtained a loan from the African Development Bank to advance a funding mechanism for the valorization of natural capital and the reinforcement of resilience to disaster risks. The allocated sum is being used to conduct a feasibility study of climate resilience through the preservation of biodiversity. In the context of the project, Madagascar National Park is the executing agency and a supervisory committee was established, and Vahatra was chosen as a member on biodiversity aspects. Voahangy and Achille take an active role in the project supervision.

NEW SPECIES DESCRIBED IN 2020 BY VAHATRA SCIENTISTS

One of the direct results of the biological inventories conducted by Vahatra and associated collected specimens, is the discovery of species previously unknown to science. In 2020 Vahatra scientists were involved in the descriptions of the following new species from Madagascar.

Grosphus mavo (endemic scorpion in the extreme south of the island) – Lourenço, W. R., Rossi, A., Wilmé, L., Raherilalao, M. J., Soarimalala, V. & Waeber, P. O. 2020. The remarkable diversity of the genus *Grosphus* Simon, 1880 (Scorpiones: Buthidae) in southern Madagascar and in particular in the region of Cap Sainte Marie. *Arachnida – Rivista Aracnologica Italiana*, 27(1): 2-35.

Haemaphysalis galidia (endemic tick known from endemic Carnivora) – Apanaskevich, D. A. & Goodman, S. M. 2020. 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*, 97: 591-599.

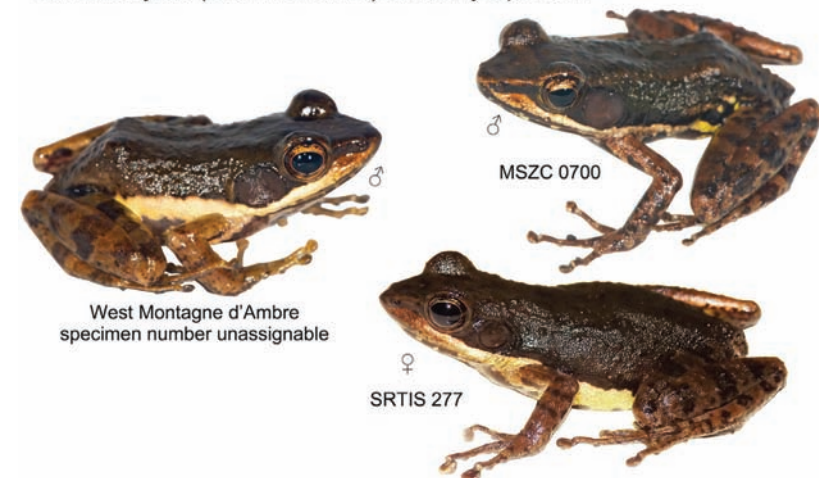
Ixodes soarimalalae (endemic tick known from Malagasy shrew tenrecs and named after Voahangy Soarimalala) – Apanaskevich, D. A. & Goodman, S. M. 2020. Description of three new species of *Ixodes* Latreille, 1795 (Acari: Ixodidae), parasites of tenrecs (Afrotheria: Tenrecidae) on Madagascar. *Systematic Parasitology*, 97: 623-637.

Ixodes uilenbergi (endemic tick known from different species of Malagasy tenrecs) – Apanaskevich, D. A. & Goodman, S. M. 2020. Description of three new species of *Ixodes* Latreille, 1795 (Acari: Ixodidae), parasites of tenrecs (Afrotheria: Tenrecidae) on Madagascar. *Systematic Parasitology*, 97: 623-637.

Ixodes uncus (endemic tick known from Malagasy shrew tenrecs) – Apanaskevich, D. A. & Goodman, S. M. 2020. Description of three new species of *Ixodes* Latreille, 1795 (Acari: Ixodidae), parasites of tenrecs (Afrotheria: Tenrecidae) on Madagascar. *Systematic Parasitology*, 97: 623-637.

Mantidactylus ambony (endemic to a massif in the extreme north of the island) – Scherz, M. D., Rasolonjatovo, S. M., Köhler, J., Rancilhac, L., Rakotoarison, A., Raselimanana, A. P., Ohler, A., Preick, M., Hofreiter, M., Glaw, F. & Vences, M. 2020. 'Barcode fishing' for archival DNA from historical type material overcomes taxonomic hurdles, enabling the description of a new frog species. *Scientific Reports*, 10, 19109 (2020).

Mantidactylus (Ochthomantis) ambony sp. nov.



Platypelis ranjomena

(endemic the central east and northeastern Madagascar) – Glaw, F., Scherz, M. D., Rakotoarison, A., Crottini, A., Raselimanana, A. P., Andreone, F., Köhler, J. & Vences, M. 2020. Genetic variability and partial integrative revision of *Platypelis* frogs (Microhylidae) with red flash marks from eastern Madagascar. *Vertebrate Zoology*, 70(2): 141-156.



Uroplatus fangorn (endemic gecko to a massif in the north of the island) – Ratsoavina, F. M., Glaw, F., Raselimanana, A. P., Rakotoarison, A., Vieites, D. R., Haalitschek, O., Vences, M. & Scherz, M. D. 2020. Towards completion of species inventory of small-sized leaf-tailed geckos: Two new species of *Uroplatus* from northern Madagascar. *Zootaxa*, 4892(2): 251-275.

Uroplatus fivehy (endemic gecko to a massif in the north of the island) – Ratsoavina, F. M., Glaw, F., Raselimanana, A. P., Rakotoarison, A., Vieites, D. R., Haalitschek, O., Vences, M. & Scherz, M. D. 2020. Towards completion of species inventory of small-sized leaf-tailed geckos: Two new species of *Uroplatus* from northern Madagascar. *Zootaxa*, 4892(2): 251-275.

SCIENTIFIC OUTPUTS OF VAHATRA DURING 2020

Publications from 2020, including those manuscripts in press and submitted, are presented in this section. Names in **bold** are those of Vahatra scientific members, as well as research associates, and those in *italics* are current or past Malagasy student members.

1. Annapragada, A., Brook, C. E., Luskin, M. S., Rahariniaina, R. P., Helin, M., Razafinarivo, O., Ambinintsoa Ralaarison, R., Randriamady, H. J., Olson, L. E., **Goodman, S. M.** & Golden, C. D. In revision. Evaluation of tenrec population viability and potential sustainable management under hunting pressure in northeastern Madagascar. *Animal Conservation*.
2. Apanaskevich, D. A. & **Goodman, S. M.** 2020. Description of a new species of *Haemaphysalis* Koch, 1844 (Acari: Ixodidae) from the *H. (Rhipistoma) asiatica* subgroup, parasite of an endemic Malagasy carnivore (family Eupleridae). *Systematic Parasitology*, 97: 591-599. <https://doi.org/10.1007/s11230-020-09943-3>.
3. Apanaskevich, D. A. & **Goodman, S. M.** 2020. Description of three new species of *Ixodes* Latreille, 1795 (Acari: Ixodidae), parasites of tenrecs (Afrotheria: Tenrecidae) on Madagascar. *Systematic Parasitology*, 97: 623-637. DOI: [10.1007/s11230-020-09944-2](https://doi.org/10.1007/s11230-020-09944-2).
4. Bezandry, N., Sefczek, T. M., Herimalala, R., Solofonirina, R., Randriamampionona, R., Randrianasolo, F., Mittermeier, R. A., Mittermeier, J. C., Rene de Roland, L.-A., **Goodman, S. M.** & Louis, Jr., E. E. Submitted. Range extension of the Hairy-eared Dwarf Lemur, *Allocebus trichotis*, in north-central Madagascar. *Lemur News*.
5. Carvalho, F., Brown, K. A., Gordon, A. D., Yesuf, G. U., **Raherilalao, M. J., Raselimanana, A. P., Soarimalala, V. & Goodman, S. M.** 2020. Methods for prioritizing protected areas using individual and aggregate rankings. *Environmental Conservation*, 47 (2) : 113-122.
6. Constant, N. L., Swanepoel, L. H., Williams, S. T., **Soarimalala, V., Goodman, S. M.,** Massawe, A. T., Mulungu, L. S., Makundi, R. H., Mdangi, M. E., Taylor, P. J. & Belmain, S. R. 2020. *Comparative assessment on rodent impacts and cultural perceptions of ecologically based rodent management in 3 Afro-Malagasy farming regions. Integrative Zoology*, 15 (6): 578-594. DOI: <https://doi.org/10.1111/1749-4877.12447>.
7. Demos, T. C., **Goodman, S. M.** & Patterson, B. D. In press. On the status of *Nycteris madagascariensis* G. Grandidier, 1937, a reputed endemic to Madagascar. *Acta Chiropterologica*.
8. Denys, C., Lalis, A., Argot, C. & **Goodman, S. M.** Submitted. Holocene subfossil rodents from the Lavajaza Cave, Central Highlands of Madagascar. *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen*.
9. Everson, K., Olson, L. E. & **Goodman, S. M.** 2020. Speciation and gene flow in two sympatric small mammals from Madagascar, *Microgale fotsifotsy* and *M. soricoides* (Mammalia: Tenrecidae). *Molecular Ecology*, 29 (9): 1717-1729.
10. Everson, K., Jansa, S. A., Olson, L. E. & **Goodman, S. M.** 2020. Montane regions shape patterns of diversification in small mammals and reptiles from Madagascar's moist evergreen forest. *Journal of Biogeography*, 47: 2059-2072.
11. *Faliarivola, M. L., Raherilalao, M. J.,* Andrianarimisa, A. & **Goodman, S. M.** 2020. The diet of Malagasy dry forest understory birds based on faecal samples. *Ostrich*, 91 (1): 35-44. Doi: [10.2989/00306525.2019.1661309](https://doi.org/10.2989/00306525.2019.1661309)
12. Gavrutenko, M., Gerstner, B. E., Kass, J. M., **Goodman, S. M.** & Anderson, R. P. In revision. Post-processing species distribution models for range estimates and climate change vulnerability assessments: Temporal matching of occurrence localities and forest cover data. *Global Ecology and Conservation*.
13. Glaw, F., Scherz, M. D., Rakotoarison, A., Crottini, A., **Raselimanana, A. P.,** Andreone, F., Köhler, J. & Vences, M. 2020. Genetic variability and partial integrative revision of partially red flanked *Platypelis* frogs (Microhylidae) from eastern Madagascar. *Vertebrate Zoology*, 70(2): 141-156.
14. **Goodman, S. M.** In press. Avian faunal remains. In *The Sheikh's House at Quesier al-Qadim*, K. S. Burke (ed.). Oriental Institute Publications, 145.
15. **Goodman, S. M.** In press. *The new natural history of Madagascar*. Princeton University Press, Princeton. With over 50 contributions from Vahatra students and scientists.
16. **Goodman, S. M.,** Fratpietro, S. & Tortosa, P. 2020. Insight into the identity and origin of *Scotophilus borbonicus* (E. Geoffroy, 1803). *Acta Chiropterologica*, 22 (1): 41-47.
17. Hassanin, A., Bonillo, C., Tshikung, D., Pongombo Shongo, C., Pourrut, X., Kadjo, B., Nakoune, E., Tan Tu Vuong, Prié, V. & **Goodman, S. M.** 2020. Phylogeny of African fruit bats (Chiroptera, Pteropodidae) based on complete mitochondrial genomes. *Journal of Zoological Research and Evolutionary Systematics*, 58 (4): 1395-1410.
18. Hassanin, A., Véron, G., Ropiquet, A., Jansen van Vuuren, B., Lécuyer, A., **Goodman, S. M.,** Haider, J. & Thanh Nguyen, T. In press. Evolutionary history of Carnivora (Mammalia, Laurasiatheria) inferred from mitochondrial genomes. *PLoS One*.
19. Herrera, J. P., Wickenkamp, N. R., Turpin, M., Baudino, F., Tortosa, P., **Goodman, S. M., Soarimalala, V., Ranaivosoa, T. N. & Nunn, C. H.** 2020. Effects of land use, habitat characteristics, and small mammal community composition on *Leptospira* prevalence in northeast Madagascar. *PLoS Neglected Tropical Diseases* 14 (12): e0008946. <https://doi.org/10.1371/journal.pntd.0008946>
20. Joffrin, L., **Goodman, S. M.,** Wilkinson, D. A., *Ramasindrazana, B.,* Lagadec, E., Gomard, T., Le Minter, G., Dos Santos, A., Schoeman, M. C., Sookhareea, R., Tortosa, P., Julienne, S., Gudo, E. S., Mavingui, P. & Lebarbenchon, C. 2020. Bat

coronavirus phylogeography in the western Indian Ocean. *Scientific Reports*, 10: 6873. <https://doi.org/10.1038/s41598-020-63799-7>

21. Lee, C., Day, J., **Goodman, S. M.**, Pedrono, M., Besnard, G., Frantz, L., Taylor, P. J., Herrera, M. J. & Gongora, J. 2020. Genetic origins and diversity of bushpigs from Madagascar (*Potamochoerus larvatus*, family Suidae). *Scientific Reports*, 10(20629). doi.org/10.1038/s41598-020-77279-5.
22. Lourenço, W. R., Rossi, A., Wilmé, L., **Raherilalao, M. J.**, **Soarimalala, V.** & Waeber, P. O. 2020. The remarkable diversity of the genus *Grosphus* Simon, 1880 (Scorpiones: Buthidae) in southern Madagascar and in particular in the region of Cap Sainte Marie. *Arachnida – Rivista Aracnologica Italiana*, 27 (1): 2-35.
23. Patterson, B. D., Webala, P. W., Lavery, T. H., Agwanda, B. R., **Goodman, S. M.**, Kerbis Peterhans, J. C. & Demos, T. C. 2020. Phylogenetics and taxonomy of the Afrotropical leaf-nosed bats (Chiroptera: Hipposideridae). *Zookeys*, 929: 117–161. <https://doi.org/10.3897/zookeys.929.50240>
24. **Rajaonarivelo, J. A.**, Andrianarimisa, A., **Raherilalao, M. J.** & **Goodman, S. M.** 2020. Vertical distribution and daily patterns of birds in the dry deciduous forests of central western Madagascar. *Tropical Zoology*, 33: 36-52.
25. **Rajaonarivelo, J. A.**, Andrianarimisa, A., **Raherilalao, M. J.** & **Goodman, S. M.** 2020. Répartition verticale des oiseaux dans les forêts sèches de l'Ouest de Madagascar. *Alauda*, 88(3): 201-210 & 88(4): 271-280.
26. **Rajaonarivelo, J. A.**, **Raherilalao, M. J.**, Andrianarimisa, A. & **Goodman, S. M.** In revision. Seasonal variation of the vertical distribution of birds in the dry deciduous forests of central western Madagascar. *The Wilson Journal of Ornithology*.
27. **Ramanantsalama, R. V.** & **Goodman, S. M.** 2020. Timing of emergence and cave return, and duration of nocturnal activity in an endemic Malagasy fruit bat. *Tropical Zoology*, 33(1): 23-35.
28. **Rasoanoro, M.**, **Goodman, S. M.**, Randrianarivelojosia, M., Rakotondratsimba, M., Dellagi, K., Tortosa, P. & **Ramasindrazana, B.** In press. Diversity, distribution, and drivers of *Polychromophilus* infection in Malagasy bats. *Malaria Journal*.
29. **Rasolonjatovo, S. M.**, Scherz, M. D., Rakotoarison, A., Glos, J., **Raselimanana, A. P.** & Vences, M. 2020. Field body temperatures in the rainforest frog *Mantidactylus (Brygoomantis) bellyi* from northern Madagascar: Variance and predictors. *Malagasy Nature*, 14: 57-68.
30. **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: 106700. DOI: [10.1016/j.ympev.2019.106700](https://doi.org/10.1016/j.ympev.2019.106700)
31. Ratsoavina, F. M., Glaw, F., **Raselimanana, A. P.**, Rakotoarison, A., Vieites, D. R., Haalitschek, O., Vences, M. & Scherz, M. D. 2020. Towards completion of species inventory of small-sized leaf-tailed geckos: Two new species of *Uroplatus* from northern Madagascar. *Zootaxa*, 4892 (2): 251-275.
32. Rossoni, D. M., Demos, T. C., **Goodman, S. M.**, Yego, R. K., Mohlman, J. L., Webala, P. W. & Patterson, B. D. 2020. Genetic, morphological and acoustic differentiation of African trident bats (Rhinonycteridae: *Triaenops*). *Zoological Journal of the Linnean Society*. DOI: [10.1093/zoolinnean/zlaa098](https://doi.org/10.1093/zoolinnean/zlaa098)
33. Scherz, M. D., **Rasolonjatovo, S. M.**, Köhler, J., Rancilhac, L., Rakotoarison, A., **Raselimanana, A. P.**, Ohler, A., Preick, M., Hofreiter, M., Glaw, F. & Vences, M. 2020. 'Barcode fishing' for archival DNA from historical type material overcomes taxonomic hurdles, enabling the description of a new frog species. *Scientific Reports*, 10: 19109 (2020). <https://doi.org/10.1038/s41598-020-75431-9>
34. Scherz, M. D., Schmidt, L., Crottini, A., Miralles, A., Rakotoarison, A., **Raselimanana, A. P.**, Köhler, J., Glaw, F. & Vences, M. In press. Into the chamber of horrors: A proposal for the resolution of nomenclatural chaos in the *Scaphiophryne calcarata* complex (Anura: Microhylidae), with a new species level phylogenetic hypothesis for *Scaphiophrynae*. *Zootaxa*.
35. Smaers, J. B., Rothman, R. S., Hudson, D., Balanoff, A. M., Beatty, B., Dechmann, D. K. N., de Vries, D. D., Fleagle, J. G., Gilbert, C. C., Goswami, A., Iwaniuk, A. N., **Jungers, W. L.**, Kerney, M., Ksepka, D. T., Manger, P. R., Monge, C. S., Rohlf, F. J., Smith, N. A., Soligo, C., Weisbecker, V. & Safi, K. In press. Evolutionary repatterning of the brain-body relationship in mammals. *Scientific Reports*.
36. Terray, L., Denys, C., **Goodman, S. M.**, **Soarimalala, V.**, Lalis, A. & Cornette, R. In revision. Skull morphological evolution in Malagasy endemic Nesomyinae rodents: A contribution from geometric morphometric analysis. *PLoS One*.
37. **Vololona, J.**, Ramavovololona, P. & **Goodman, S. M.** 2020. Régime alimentaire de *Rousettus madagascariensis* (Chiroptera : Pteropodidae) dans la Réserve Spéciale d'Ankarana, Madagascar. *Bulletin de la Société Zoologique de France*, 145 (4): 365-381.
38. **Vololona, J.**, Ramavovololona, P., **Noroalintseho Lalarivoniaina, O. S.** & **Goodman, S. M.** 2020. Fleurs visitées par *Rousettus madagascariensis* G. Grandidier, 1928 (Chiroptera : Pteropodidae) dans la Réserve Spéciale d'Ankarana, Madagascar. *Bulletin de la Société Zoologique de France*, 145 (1): 49-67.





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