



MISSION REPORTS N°6

MERCi PROJECT
MISSION IN DOMINICA
APRIL 2023



MISSION REPORT – Avril 2023

Study of the diet and blood parasites of an invasive anole in Dominica and strengthening of scientific collaboration between Guadeloupe and Dominica.

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CONTEXT

The French and English West Indies contribute significantly to the exceptional species richness that makes the Insular Caribbean one of the world's biodiversity hotspots. This wealth of species is now threatened by the impact of invasive alien species (Myers et al. 2000, Tree; Kairo et al. 2003, Report to the Nature Conservancy). Because of their small size, their proximity and the intensity of port exchanges between the islands of the Lesser Antilles, it is important to develop joint study projects and build local capacity for biodiversity conservation, particularly with regard to invasive alien species. The MERCI ("Managing Exotic Reptiles on Caribbean Islands") project, led by the association Caribaea Initiative (CI) and funded by Interreg Caraïbes, was designed to develop inter-island collaboration for training local partners and acquiring information on certain exotic reptiles in the Lesser Antilles.

Within the Lesser Antilles, Dominica is home to a single species of native anole lizard, *Anolis oculatus*, now threatened by the introduction of an anole from Puerto Rico, *A. cristatellus* (Eales et al., 2008, Mol. Ecol. ; Fig. 1). This brand-new interaction in the evolutionary history of the native species needed to be monitored in order to assess the risks for this endemic species, but also for other species in the Insular Caribbean, and to devise appropriate management plans.



Figure 1. Anoles found in Dominica: *Anolis oculatus* (endemic, photo: Robert Hoogveld) and *A. cristatellus* (invasive, photo: Joe Burges).

Since 2021, two expert missions have resulted in the training of several officials from the Forestry Wildlife and Park Division (FWPD, <https://forestry.gov.dm/>) - the local partner - and the collection of data for three different studies (see reports N°1 and 2, <https://www.merci->

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project.com/en/dissemination-and-communication/#publications). Data were collected on the behaviour, morphology, habitat and survival of native and non-native anole populations under pressure from invasive anoles. In order to complete the activities corresponding to the MERCI project's component on the impact of exotic anole lizards in the English West Indies, it was necessary to obtain information on the diet and blood parasites of the Puerto Rican anole in Dominica.

This report describes the activities of the third and final mission to Dominica, the aim of which was to train a local team to collect data on diet and blood parasites, and to collect and preserve samples. It also reports on discussions with local representatives on prospects for collaboration, in particular with the Minister of the Environment Hon. Cozier FREDERICK (<https://dominica.gov.dm/41-ministries/138-ministry-of-environment-rural-modernisation-and-kalinago-upliftment>).

ACTIVITIES CARRIED OUT

- Meeting to adjust work schedule and take final steps for mission
- Meeting with the team
- Interviews with Mr. Minchinton BURTON, Director of FWPD, and Ms. Jacqueline ANDRE, Senior Officer at FWPD
- Interview with former MERCI-funded Master 2 student, Ms Norma ANTONY, Forest Officer at FWPD
- Visit to the Ministry of Agriculture's molecular diagnostics laboratory and interview with Mr. Ryan ANSELM, Head of Dominica's Phytosanitary and Quarantine Service and Dr. Reginald THOMAS, Head of the Veterinary Service
- Field training and sample collection
- Field photography and interviews with MERCI project participants
- Study presentations and dissection training
- Transcription of field data and database correction
- Work on database for survival study carried out in 2022
- Research and purchase of equipment for FWPD
- Interview with science students at Dominica State College
- Interview with Dr. Etienne BEZAULT, lecturer at the Université des Antilles (UA) and member of CI's Scientific Advisory Board, for preparation of MSc BRISBANE thesis subject.
- Interview with the Minister of the Environment on prospects for collaboration following the project.

DATABASE FOR SURVIVAL STUDY

Following the training mission for the study of the impact of the invasive species on the survival of the native species, the trained team continued the capture-mark-recapture monitoring for 6 months (May-October 2022). After revision of the data collected by the team, the information is usable for 661 individuals (*A. oculatus*: 538, *A. cristatellus*: 137), 117 of which were recaptured. Statistical analysis to estimate survival will be carried out later, in ongoing exchange with the team.

DIET STUDY

Trained personnel

A team of four FWPD staff members was trained in the euthanasia and conservation of samples collected in the field. This was followed by three theoretical and practical training sessions (Fig. 2), preceded by a presentation of the study. A total of 14 FWPD staff and three science students from Dominica State College were trained in dissection (Appendix 1).



Figure 2. Training in the dissection of anole lizards.

Study sites

Sample collection took place at two sites in northern Dominica, already sampled during previous missions: Colihaut, a forest site where the native species is present but the invasive species is absent ("natural" state), and Cabrits a forest site where the two species interact (Fig. 3).



Figure 3. Sample collection sites for the study of anole diet in Dominica: left, Colihaut; right, Cabrits.

Data collected

A total of 90 adults of both species were captured (*A. oculatus*: Colihaut, 22 individuals, Cabrits, 35 individuals; *A. cristatellus*: Cabrits, 33 individuals). Data on time of capture, perch support, sex, body length (snout to cloaca) and weight were collected. Faeces samples were collected from four *A. oculatus* and 14 *A. cristatellus*, enabling us to compare the diets of these species. Individuals of the invasive species were euthanized and the entire digestive tract contents were recovered during dissections. Liver samples were also taken to determine the taxonomic composition of the parasites present in the population, the individual parasite load and the infestation rate of the population. The samples are stored at -5°C on the FWPD premises, awaiting an export permit from Dominica's Ministry

of the Environment (already being processed following a request from the FWPD). They will be brought back to Guadeloupe by MSc. BRISBANE, once the permit has been issued.

What happens next

Digestive tract contents and liver parasites will be analyzed to identify the taxonomic groups present via genetic analysis using the metabarcoding technique. The genetic analysis will be carried out by Ms. Maryne ROMUALD (CI-funded intern, 2nd year of the Bachelor of Technology program, BUT, Biological Engineering, Environmental Sciences and Ecotechnologies), under the supervision of Dr. Christopher CAMBRONE, CI Scientific Coordinator. The genetic laboratory of Marine Biology and Aquatic Ecosystems of the University of the West Indies (<https://www.univ-antilles.fr/recherche/structures-de-recherche/umr-borea-biologie-des-organismes-ecosystemes-aquatiques>) will be made available for the analyses, in coordination with Dr. Etienne BEZAULT, researcher at this establishment.

VIDEOS FOR PROJECT COMMUNICATION

To publicize the progress of the MERCI project in Dominica, videos were made during interviews with MSc. ANTHONY, about her internship with CI, and MSc. BRISBANE and Ms Ira PIERRE, Amphibian Technician at FWPD, about capture-mark-recapture monitoring. In addition, a local service provider has been called in to take aerial and terrestrial photos of the landscape and fauna of the sampled sites, followed by fieldwork. The videos will be edited by Dr. Sophie LABAUDE, CI's Communications Manager, for the production of audiovisual promotional materials.

MATERIEL FOURNI

MATERIALS SUPPLIED

- Slide show on the progress of the MERCI project in Dominica and the diet study training course
- Working protocol
- Field sheets
- Excel spreadsheet for database
- Canes for capturing lizards
- Dissection kits
- Material for collecting and preserving samples
- Small field equipment
- Hard drives and USB keys

An interview with Ms. ANDRE, Senior Officer at FWPD, enabled us to identify the needs of this institution for the implementation of studies on invasive reptiles. Office and field equipment such as computers, projectors, GPS and waterproof backpacks, unavailable on the territory at the time of the mission, will soon be sent to the FWPD.

OPPORTUNITIES FOR COLLABORATION

Training program in genetic analysis

In order to gather information on the capacity of local institutions to develop genetic studies for biodiversity conservation, we visited the molecular diagnostic laboratory of the Ministry of Agriculture (Fig. 4). The laboratory managers, Mr. ANSELM and Dr. THOMAS (<https://cahfsa.org/dominica/>), explained that the laboratory has the basic equipment to perform DNA extraction and amplification on material of animal origin; and that the Ministry of Agriculture could collaborate with the FWPD for the analysis of wildlife samples. However, there are no trained genetic analysis personnel in the laboratory. Following this interview, Dr. BEZAULT confirmed the possibility of creating a training program for Dominican personnel in genetic analysis, also in collaboration with CI partner Ross University School of Veterinary in St Kitts.



Figure 4. Molecular diagnostic laboratory of the Ministry of Agriculture.

Technical training program for biodiversity

Discussions with undergraduate students at Dominica State College and FWPD technicians revealed the need for technical training in new biodiversity monitoring methods and basic statistical analysis of biological data. Following these discussions, Prof. Frank CEZILLY, former president of CI, confirmed the possibility of preparing a training program for technical staff in Dominica.

Thesis on invasive reptiles in Dominica

It is possible to combine the study on Dominica's anoles with the ongoing study by MSc. BRISBANE on the invasive iguana (*Iguana iguana*) to prepare a project to assess the impact of exotic reptiles on Dominica's biodiversity, which would enable MSc. BRISBANE to opt for the rank of Doctor. Following a videoconference interview, Dr. BEZAULT agreed to co-supervise the thesis and register MSc. BRISBANE to the AU Doctoral School.

Collaboration program with the Ministry of the Environment

The progress of the MERCI project was presented to the Hon. Cozier FREDERICK, Minister of "Environment, Rural Modernisation, Kalinago Upliftment and Constituency Empowerment" during an interview, as well as the prospects for collaboration following the project. At the end of the interview, the Minister expressed his interest in extending the collaboration for the training and development of local capacities for biodiversity monitoring. The meeting concluded with the Minister requesting a formal proposal for a collaboration program.

APPENDIX 1. List of dissection training participants.

Training for dissection - FWPDP, Roseau 17/04/2023

PARTICIPANTS


<u>Name</u>	<u>Position</u>
Ryan Royer	W.N.T
Harrison Paul	Forester I Ag. Parks.
Allixion Benjamin	Forester II
Digel Marux	Jocel Robinson
Caraleny Pierre	Forester II
Lawrence Oalmond	Protection Unit
Richmond Toussaint	Forester II
Marvin LeBlanc	
Kim	
(Tommy) Alixson Cuyette	Forester 2
Ivor Peter	FORESTER II
Jeanette Brisbane	Assistant Forest Officer
Ricardo Dominique	
Sheldon Simmon	FORESTER I (Ag) Central Range
Ira Angelika Pierre	Forester I Amphibian Technician

Training for dissection - Roseau 18/04/2023

Participants


Angel St Jean	Geography Students Dominica State College
Tarah Sears	
Chelsea Lujay	

APPENDIX 2. Details of the presentation made to the Minister of the Environment for collaboration.



Developing capacity building in DOMINICA

What about after MERCI?



Education:


- PhD / MSc / Technician → Leadership in EN Lesser Antilles

Trainings:


- Online courses on basic statistics for technicians (videoconferences)
- Field training on modern techniques for monitoring (ex: camera tramps, sound recorders)
- Training on genetic analysis for veterinarians

Fundings:



- Help for writing proposals and managing projects



PhD: Jeanelle Brisbane





Pr. Frank Cézilly

Dr. Anne Becker
Dr. Nicole Atherley

St Kitts & Nevis

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