



MISSION REPORTS

MERCi PROJECT
MISSION IN SAINT LUCIA AND DOMINICA
NOVEMBER 2021

INTRODUCTION

In the Lesser Antilles, several species of lizards of the *Anolis* genus have recently been introduced, in particular through boats or containers transiting between the islands, but also from captive individuals intended to be sold as pets. These exotic species, that are invasive or likely to become so, constitute a threat to local biodiversity. They constitute one of the major research axis of the MERCI project, financed by the Interreg Caribbean program of the European Union and carried out by the NGO Caribaea Initiative. This project aims to study invasive exotic reptiles in the insular Caribbean to better anticipate and control their possible proliferation.

In Saint Lucia, there are three species of recently introduced exotic anoles: *Anolis extremus* (native to Barbados), *A. watsii* (native to Antigua) and *A. sagrei* (native to Cuba). They all are a potential threat to the local species, *A. luciae*. In Dominica, the Puerto Rican anole, *A. cristatellus*, likely reached the northeast region of the island in early 2014, where its multiplication led to the decline of the native species *A. oculatus*. At the end of 2020, the invasive species *A. roquet*, native to Martinique, was also identified in the northwest of Dominica.

In this context, the first field mission of the MERCI project aimed to study the native and invasive anole species of these two islands, in order to provide the first elements of knowledge with the objective of being able to predict the dynamics expansion of exotic species and their interactions, both among themselves and with native species. The actions carried out in the field also served to train the local partners participating in the project in the specific techniques to sample and study anole populations in the field, thus ensuring a coherent protocol within the different territories.

EXECUTION OF THE MISSION

The mission took place in November 2021, from 11th to 18th in Saint Lucia, and from 19th to 27th in Dominica. During the mission, three people commissioned by Caribaea Initiative went to the Antilles: Dr. Claire Dufour, lecturer at the Université de Bourgogne (Dijon), Dr. Anthony Herrel, researcher at the National Museum of Natural History (Paris) and Sébastien Motreuil, research engineer at the CNRS (Dijon). They joined local partners in Saint Lucia (Department of Forest and Lands Resources Ministry of Agriculture, Fisheries, Physical Planning, Natural Resources and Co-operatives) and Dominica (Forestry, Wildlife and Parks Division).

PARTNER TRAINING

In order to set up a standard methodology, shared between the different sites involved in the study of anoles, one of the major goals of the mission was the training, both theoretical and practical (in the field), of the various people involved in the project.

During the training, the different knowledge and skills acquired by the partners were as follows:

- **Identification of species encountered in the field.** The identification of species, as well as the distinction between males and females, are based on precise morphological criteria. The species studied present a more or less pronounced sexual dimorphism. An additional difficulty during identification lies in the existence of different "ecomorphs": the phenotype of individuals belonging to the same species may vary according to the type of habitat they occupy.
- **Capture of individuals, identification, handling and transport.** The site of capture needs to be identified in a consistent and complete manner, using a comprehensive name and GPS coordinates. It is briefly described (type of environment), and a photo completes its description. Disturbances must be kept to a minimum (cryptic clothing, work in silence and without sudden movements). Respecting the specific techniques of capture, marking (code written on the abdomen of individuals) and transport (bags placed in coolers to protect the lizards from the heat) ensures the well-being of the animals.
- **Data recording.** The data collected concern the habitat of the lizards (type, height and diameter of the perches, density of the canopy) and the morphological data of the individuals.
- **Study of the escape behavior.** Participants were trained to quantify the escape behavior of anoles before capture. This behavior provides a standardized measure of the anti-predator behavior of anoles.
- **Management of collected data.** The data recorded in the field in notebooks will likely be used by people other than the person who noted them. The data is digitalized on an Excel table shared online between the various partners, thus requiring a standardized digitization of the data.

During the mission, nine partners were trained in Saint Lucia, and four partners in Dominica (figures 1 and 2).



FIGURE 1. PARTNERS TRAINED IN SAINT LUCIA ACCOMPANIED BY DR. CLAIRE DUFOUR.



FIGURE 2. PARTNERS TRAINED IN DOMINICA ACCOMPANIED BY SEBASTIEN MOTREUIL.

DATA COLLECTION

Methodology

Several sites have been prospected in Saint Lucia and Dominica, in variable types of environment (urban, forest, etc.). When an individual was spotted, its behavior at the time of the observation as well as its orientation were recorded. The identification of the species was made by observing its morphological characteristics, as well as the determination of its sex, and its age (adult vs juvenile).

The quantification of the escape behavior of lizards could be carried out on many individuals. The protocol consisted of approaching individuals and measuring the distance at which the flight behavior was triggered, as well as the distance traveled during the flight. These data provide information in particular on the perception of the danger of predation by individuals.

The individuals were captured using a fishing rod fitted with a noose (figure 3), then marked with a code written on their abdomen. Cloth bags, protected from the heat in coolers, were used for transport.

For each individual, the GPS data of the place of capture were noted (Figure 3). Data on the ecology of the species were collected through the characterization of its habitat, at the exact place where the lizard was spotted before its capture: type of perch (branch, trunk, ground, wall, etc.), perch height and diameter, nearest perch (type, distance and diameter) and canopy density (measured with a densimeter, Figure 3). These data will be used in particular to investigate the impact of interspecific competition between anoles, whose habitat occupation may vary according to their morphology.

The lizards were weighed and measured (length from the tip of the snout to the vent and length of the legs). Clinging force and biting force were also measured, and their body temperature noted (Figure 3).



FIGURE 3. DATA COLLECTION IN THE FIELD. FROM LEFT TO RIGHT AND FROM TOP TO BOTTOM: CAPTURE OF INDIVIDUALS, LOCATION OF GPS COORDINATES, USE OF A DENSIMETER, DENSIMETER, MORPHOLOGICAL MEASUREMENT AND MEASUREMENT OF CLINGING FORCE.

Data collected

In Saint Lucia, four species have been observed (figure 4): the local species *A. luciae* as well as the three invasive species *A. wattsi*, *A. sagrei* and *A. extremus*. A total of 137 individuals were measured, and animal ecology data were collected for 192 individuals (see Table 1 for details).

In Dominica, two species have been observed (figure 5): the local species *A. oculatus* and the invasive species *A. cristatellus*. The presence of the invasive species *A. roquet* was not confirmed during this mission. A total of 124 individuals were measured, and animal ecology data were collected for 143 individuals (see Table 2 for details).



FIGURE 4. ANOLE LIZARD SPECIES IDENTIFIED IN SAINT LUCIA. LEFT TO RIGHT AND TOP TO BOTTOM: *A. LUCIAE*, *A. WATTSII*, *A. SAGREI* AND *A. EXTREMUS*. CREDITS: CLAIRE DUFOUR.



FIGURE 5. SPECIES OF ANOLE LIZARDS IDENTIFIED IN DOMINICA. TOP, *A. OCULATUS* (MALE AND FEMALE); BOTTOM, *A. CRISTATELLUS* (MALE AND FEMALE). CREDITS: CLAIRE DUFOUR.

TABLE 1. SUMMARY OF DATA COLLECTED FOR EACH SPECIES OF LIZARD IN SAINT LUCIA

	Measures		Temperature			Behavior		Ecology		
	M	F	M	F	J	M	F	M	F	J
<i>A. luciae</i>	32	11	8	5	1	14	22	43	18	-
<i>A. watsii</i>	21	17	7	1	-	14	8	29	26	-
<i>A. extremus</i>	22	9	-	-	-	-	-	27	19	-
<i>A. sagrei</i>	19	6	6	1	-	-	-	15	12	3
TOTAL	137		29			43		192		

TABLE 2. SUMMARY OF DATA COLLECTED FOR EACH SPECIES OF LIZARD IN DOMINICA

	Measures		Temperature		Behavior		Ecology	
	M	F	M	F	M	F	M	F
<i>A. oculatus</i>	32	24	27	15	14	11	34	26
<i>A. cristatellus</i>	45	23	35	13	18	26	56	27
TOTAL	124		90		69		143	

CONCLUSION

The mission led to the training of several partners, while a substantial first set of data could be collected on native and invasive anole lizards from Saint Lucia and Dominica. It was also useful to understand the technical requirements in the field (necessary equipment for instance). The data already collected will be analysed to estimate the distribution of the species within the different habitats of each island and to specify the ecological, morphological and behavioral characteristics of each of the species. These data will be used in particular to better understand the possible competition that may exist between these species, as well as its consequences. Future missions will be necessary to complete the data, collect additional material, in particular photographs of the lizards in order to develop a mobile species recognition application, and train other partners.