MERCI project

Managing exotic reptiles on Caribbean islands

MISSION REPORTS N°4

MERCI PROJECT

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Mission reports *Trachemys spp.* & *Gecko gecko* Martinique

Mission period: November 22nd to November 28th, 2022
As part of the MERCI Project

Mission coordinators:
CAMBRONE Christopher, Caribaea Initiative

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I. Introduction and background

a. Trachemids

The Yellow-bellied slider turtle, *Trachemys scripta*, is ranked among the 100 most invasive species in the world (Powell et al, 2011; Lowe et al., 2000). It is a freshwater turtle native to the United States of America and Mexico. The species is the subject of an important trade that led to its introduction in a large number of regions throughout the world (Ramsay et al., 2007; Maillard and David, 2014). Omnivorous and able to adapt to a very wide variety of climates and habitats, its presence and expansion in the Caribbean region represents a potential danger for the local flora and fauna of the French West Indies, as shown on native European ecosystems (e.g. Cadi and Joly, 2003; Polo-Cavia et al., 2009, 2010, 2011). Although its presence in Guadeloupe was reported as early as 1975 (Schwartz and Thomas, 1975) and in Martinique in 1997 (Servan and Arvy, 1997), its impact on the native ecosystems of these islands remains poorly documented.

The Yellow-bellied slider turtle is found in sympatry on these two islands with another invasive exotic species belonging to the same genus, the Antillean slider, *T. stejnegeri*. Native to several other islands in the Caribbean region such as Porto Rico (Culebra and Vieques), Great Inagua (Bahamas), Haiti, Dominican Republic, and the Turks and Caicos Islands (Seidel and Inchaustegui, 1984; Jones and Willey, 2011; Powell et al., 2011; Rhodin et al., 2017), the Antillean slider was probably introduced to Guadeloupe during the Amerindian period, while its presence in Martinique has only recently been reported (Bourgade, 2021). Like the Yellow-bellied slider turtle, it lives in a great diversity of natural and anthropized environments (Seidel and Inchaustegui, 1984; Jones and Willey, 2011), and its spatial distribution and the abundance of its introduced populations, as well as as their impact on native ecosystems, also remain unknown.

To this end, the present mission consisted in continuing the study on the trachemids captured and euthanized during the first mission in June 2022 in Martinique in order to assess the impact of these species on the native ecosystems. To do this, the 23 turtles previously euthanized and kept at -20°C until then were dissected to remove their digestive tract and take a liver sample. The second type of samples will be used to detect some pathogens or parasites which trachemids could carry.

b. Tokay geckos

The tokay gecko, *Gekko gecko*, one of the largest species of Gekkonidae, is native to continental and island regions of Southeast Asia. Being particularly popular in the wildlife trade, the species has been introduced to a large number of regions and islands across the globe (e.g. Hawaii, Belize, Madagascar, Florida and several Caribbean islands; Caillabet, 2013). *G. gecko* has been observed in Martinique since the 1970s, and was introduced to Guadeloupe between 2000 and 2010 (Breuil et al., 2009). The tokay Gecko is a generalist species, feeding on a wide variety of prey, such as arthropods, gastropods, small vertebrates (other reptiles, mice, and birds), and eggs of various species (Meshaka et al., 1997; Aowphol et al., 2006). In addition, the species can live in both natural and urban environments. Its diet, its aggressiveness, and the fact that it is a potential vector for parasites and antibiotic-resistant bacteria (Smith et al., 2012; Casey et al., 2015), make the tokay gecko a threat to indigenous ecosystems from the regions where it has been introduced. However, like the trachemids, its impact on these ecosystems remains unknown, particularly in Guadeloupe and Martinique.

To better understand its impact, artificial shelters were installed so that geckos, with nocturnal habits, occupy them during the day to shelter there. During this mission, the shelters were inspected to see if they were occupied by tokay geckos. Capture attempts were carried out during the day, by testing different methods in order to find the most effective one for the next mission. Future missions will consist of capturing the geckos, euthanizing them and dissecting them to remove their digestive tract and a take liver sample, similarly as trachemids.

II. Methods and results

Mission period: November 22nd to November 28th, 2022

a. Dissection of the trachemids

Dissections of the trachemids were performed in the laboratories of the French West Indies delegation of IFREMER in Martinique. In order to access the coelomic cavity of the turtles, the carapaces were cut using a dremel at the level of the flanks connecting the plastron and the carapace (i.e., on each flank, between the lower and upper limbs, Photo 1). The skin and tissue adhering to the breastplate were then cut using a sterile scalpel. Once the coelomic cavity was opened (i.e., the plastron removed), the digestive tract, from the esophagus to the anal sphincter, was removed, taking care not to lose its contents. The digestive tracts were stored dry, at -20°C, in one or several 50 ml Falcon tubes depending on the size of the tract and its contents. For liver samples, a piece of each lobe was removed and stored in absolute alcohol at -20°C in 5 ml tubes.

Photo 1: Photograph of the ventral side of a trachemid. The two-way dashed arrows indicate the shell cutting area with the dremel.

b. Visit to the artificial shelters

The artificial shelters were made using a foam gym mat and two bungee cords. They were installed around a tree in such a way as to create interstices and offer potential shelters for the geckos (Photo 2). Seventeen artificial shelters were installed in six sites, three in natural forest and three in urbanized forest, located in the municipalities of Robert (97131), Lamentin (97232) and Trinité (97220; Figure 1).

Different capture techniques were tested in order to find the most effective one. The first capture technique considered is that of the lasso. It involves using a pole or fishing rod with a noose at the end to catch geckos at the neck area. This technique proved to be ineffective because as soon as we lifted the artificial shelters the geckos fled at full speed towards the tops of the trees. It was the same when trying to surprise the geckos by playing on the speed of capture by hand. The last technique used was to startle the geckos under carpets, blind them with a powerful lamp (>1000

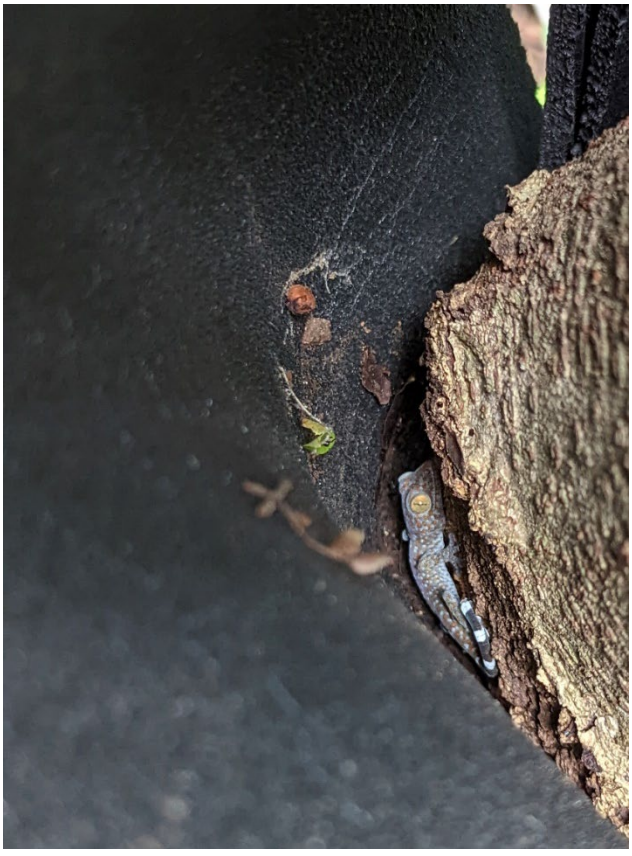

Photo 2: Tokay gecko in one of the artificial shelters installed.

lumens) to immobilize them and grab them by hand. This last method proved to be the most effective and we will use it on our next mission.

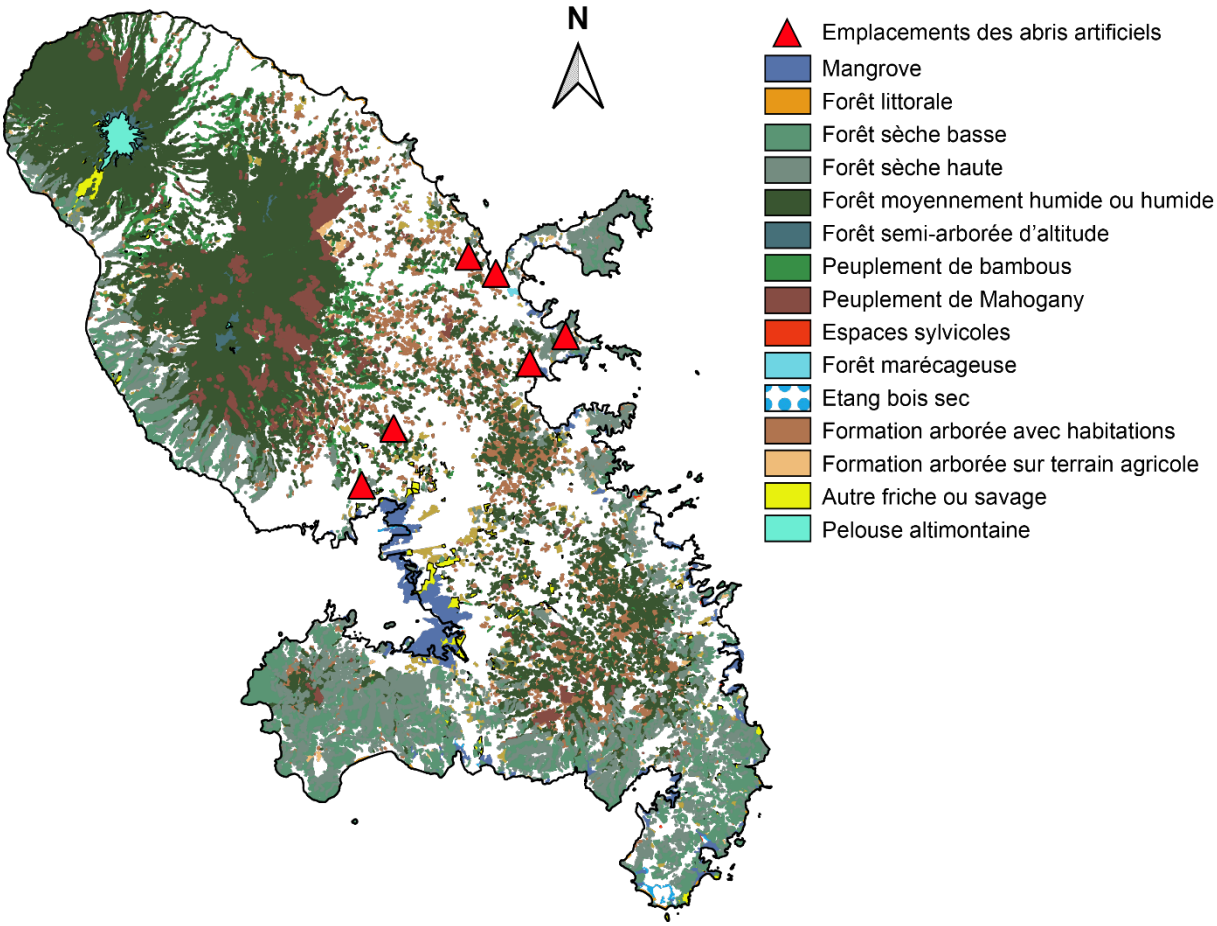

Figure 1: Plant formations of Martinique and locations of artificial shelters where tokay gecko captures will take place.

III. Conclusion and perspectives

The second mission in Martinique led to the collect of the stomach contents of 23 trachemids which will be used in April 2023 to identify, through metabarcoding analyses, the animal and plant species that they consumed. Liver samples could also be taken to identify various parasites or pathogens. Regarding tokay geckos, the mission made it possible to assess the effectiveness of artificial shelters and to define the most appropriate capture method. In April 2023, a final mission will be carried out to capture geckos, perform dissections and collect stomach contents and liver samples. As with trachemids, these samples will be used to assess the impact of this invasive alien species on their host ecosystems by determining their diet, and the parasites and pathogens likely to infect them, respectively.

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