

DNA test kit saves thousands of Earth's most bizarre turtles

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Each year, thousands of Matamoras turtles end up in the hands of traffickers. They are a very lucrative find for pet markets in the United States, Europe and Asia where they can be sold, sometimes costing upward of \$300. Credit: Florida International University

Using a rapid DNA testing toolkit developed by FIU researchers,

Colombian officials stopped an illegal shipment of 2,200 Matamata turtles and returned them to the Orinoco river basin.

Diego Cardeñosa, FIU postdoctoral researcher in the Institute of Environment at the College of Arts, Sciences & Education, worked with a collaborative team of Colombian scientists and authorities at the International Airport Alfredo Vásquez Cobo in Leticia, Colombia to test the shipment of freshwater turtles. The DNA testing toolkit developed by Cardeñosa and FIU marine scientist Demian Chapman is fast, portable, easy to use and highly accurate in identifying [species](#).

Matamata turtles are native to South America and are most recognizable by their rough, knobby shell and snorkel-like snout. Each year, thousands of these unique, bizarre-looking animals end up in the hands of traffickers. They are a very lucrative find for pet markets in the United States, Europe and Asia where they can be legally sold, sometimes costing upward of \$300. It is illegal to trade Matamata turtles in Colombia, where they are currently listed as a near threatened species.

When the shipment of baby Matamata turtles was found with their alien-like features, customs officials didn't need a DNA test to know they were looking at a protected species. What they didn't know is what species of Matamata they were looking at. Originally thought to be a single species, a recent discovery revealed there are actually two genetically distinct species of Matamata turtles. Virtually identical in appearance, one species exclusively resides in the Orinoco river basin and the other in the Amazon River basin.

When a shipment of illegally trafficked live Matamata turtles is found, it is important to quickly identify the species so they can be returned to the correct river basin. Introducing an Orinoco turtle to the Amazon River basin—or vice versa—could have negative effects that would ripple throughout that entire native turtle population, affecting evolutionary

processes and its genetic health.

Traditionally, customs officials transport a few confiscated turtles to a lab for DNA testing—not quite an expeditious endeavor. While the officials would wait for results, they are usually also trying to keep thousands of turtles alive.

With the DNA testing toolkit, officials on the ground can accurately identify the species on-site in about two hours, quickly giving them the information they need to significantly reduce stress on the animals and return them to the wild. The cost for the test is about \$1 per sample.

"When our test was used to identify and make sure those turtles were returned to the wild, it felt great," Cardeñosa said. "What feels even better is that now we can use these tools to help many other species that are subject to crimes against wildlife, including the illegal pet trade."

With funding from the Paul G. Allen Family Foundation, Cardeñosa and Chapman initially created the toolkit to help customs officials differentiate between illegal shipments of shark fins and meat and those containing protected species in the fin trade. In 2020, the toolkit led to a historic seizure of illegally trafficked fins in Ecuador. It has also helped detect other illegal trade. When Cardeñosa was living in Hong Kong, officials asked him for a test to detect European eels [leading to the first prosecution of European eel smugglers in Hong Kong history](#).

The Matamata were a natural next step for the DNA toolkit. After all, as Cardeñosa points out, its applicability is endless.

"My goal is to bring this DNA toolkit to as many countries as I can and make in-port inspections using DNA part of the daily routine of law enforcement agencies around the world," Cardeñosa said. "This technology can help us to enhance our capacity to act in a timely manner

against illegal trade in sharks, eels, freshwater [turtles](#) and many other threatened species."

The findings were recently published in *Aquatic Conservation: Marine and Freshwater Ecosystems*.

More information: Diego Cardeñosa et al, Rapid species and river-of-origin determination for matamata turtles (*Chelus* sp.) using real-time PCR: Facilitating rapid return of trafficked specimens back to the wild, *Aquatic Conservation: Marine and Freshwater Ecosystems* (2021). [DOI: 10.1002/aqc.3613](https://doi.org/10.1002/aqc.3613)

Provided by Florida International University

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