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Turtle Matchmakers

Using advanced conservation genetics to save Dahl's Toad-headed Turtle

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It's a new day in the La Carranchina Natural Reserve. Rain is pouring down and the newly created ponds are filled to their brims with water. Thousands of native trees and shrubs we've planted here are now well irrigated, too. The hope of recovering a beautiful, unique, and endemic Colombian turtle species wells up in the hearts of the team.

Our goal is to help recover populations of Dahl's Toad-headed Turtle (*Mesoclemmys dahli*), a species found only in Colombia. This species is threatened by habitat loss and, as a result, the silent menace of inbreeding. Based on our team's research, led by Dr. Natalia Gallego-García, we know that land cover changes have fragmented this species into small, isolated populations, leading to increased mating amongst relatives and low levels of genetic diversity. If gene flow is not restored, genetic deterioration will further drive this species to the brink of extinction.

Because habitat restoration in and of itself will take too long for natural gene flow to occur, we are implementing a Dahl's Toad-headed Turtle genetic rescue program to prevent genetic isolation from continuing its detrimental impact to the turtle's population. This program involves translocating animals from other localities into the reserve,

where a local population of this species resides, to reduce inbreeding and increase genetic diversity. This is the first program of its kind for a turtle species in Colombia.

In April 2022 we embarked on a quest, accompanied by Nilson Caraballo and Jair Bonilla from the community of Bajo Limón. The two have unmatched skills when it comes to finding Dahl's Toad-headed Turtles, having now worked with us for more than six years monitoring a population of this cryptic species. With the team assembled and our permits in hand, we visited several rural towns in the municipality of Lorica, Córdoba Department. We identified this area through our previous range-wide genetic characterization as having turtles with the best-matched genes with those at La Carranchina Natural Reserve. Technically speaking, the turtles in Lorica are the most genetically different from the turtles in the Reserve, but are adaptively compatible because they inhabit similar environments. With this strategy, we expect to increase genetic diversity and reduce inbreeding without incurring a high risk of maladaptation (failure to adjust adequately or appropriately to the environment or situation). After 15 days of searching, we secured 18 individuals from our selected donor population.





From left to right: The turtles are ready to take a three-hour trip to their new home, the La Carranchina Natural Reserve, as part of the genetic rescue program; Germán Forero-Medina takes blood samples and affixes transmitters on the turtles before releasing them; A translocated Dahl's Toad-headed Turtle takes in the surroundings of its new home at the Reserve.

On April 17th, with crates full of genetically important turtles, we embarked on a three-hour drive to the Reserve, a 120-hectare (297-acre) property in San Benito Abad (Sucre Department), which we established in 2019. The Reserve itself appears as a lush oasis, markedly in contrast with its surroundings, due to the pervasive conversion of native tropical dry forest to agriculture and livestock pastureland. The Reserve's upland now features a recovering tropical dry forest resulting from the intensive efforts of our restoration team. The team includes members of the adjacent community of Flechas, such as Yeiner Vega, Donys Macheo, and a group of women who work in the greenhouse, and is led by restoration expert, Selene Torres. Together, the team has planted more than 7,000 seedlings and saplings of native trees and other plants to restore habitat for Dahl's Toad-headed Turtle and other species, such as the Red-footed Tortoise (*Chelonoidis carbonarius*), that also occur there.

Upon arrival, we affixed VHF transmitter devices to the translocated turtles' shells, collected blood samples from each of them for future genetic analysis, and released them into the newly created ponds. We built these ponds with the dual intention of creating additional habitat to accommodate translocated turtles and to expand the already existing aquatic habitat that features a stream and vegetated wetlands where the resident turtles live.

Today, we are releasing the 18 translocated turtles from Lorica into the ponds, matching them with local turtles:

translocated females with local males in some ponds and translocated males with local females in others. We now hope that all the new turtles settle in the reserve, survive, and mate with local partners. If successful, our efforts here will reduce inbreeding, increase the Reserve's turtle population size, and improve the future for the species.

We've rolled the dice. We see the emotion in the eyes of the group as we all observe the ponds full of turtles. As our month in the field comes to an end, we say our goodbyes to Jair, Nilson, and Yeiner, and to Donny Manchego our Reserve ranger, who in our absence will watch over these turtles as if they were his own children. As we say goodbye to them, we see in their faces pride for helping with this incredible task. We return home, but our minds are still on those ponds, in those turtles, and in the dreams of saving a species. 🐢

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