Barba Azul Nature Reserve
Report: July 2019

Park guard, Carlos Roca, observed three pairs of Blue-throated Macaws exploring the newly created breeding habitat in the Barba Azul Nature Reserve. These elevated "penthouse" nestboxes were placed in August 2018 and mimic the breeding habitat that Armonía discovered in 2017. Macaws are known to identify breeding cavities many months before they are ready to breed. We will keep a watchful eye on these penthouse nestboxes and hope that the birds decide to stay in November to start breeding, completing full lifecycle conservation of the species at the Barba Azul Nature Reserve (*Picture taken by Tjalle Boorsma)*. See official penthouse nestbox article: https://bit.ly/2Y3nFpu

Project photos can be downloaded from:
www.flickr.com/photos/128583429@N05/albums/72157657123371838

Conservation and development of the Barba Azul Nature Reserve in 2019 is supported by:

AMERICAN BIRD CONSERVANCY
Bird Bolivia TOURISM & TRAVEL AGENCY
ICFC where nature needs us most International Conservation Fund of Canada
MARCH CONSERVATION FUND
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U.S. FISH & WILDLIFE SERVICE
Friends of Barba Azul Nature Reserve
WORLD LAND TRUST

1. Barba Azul Nature Reserve

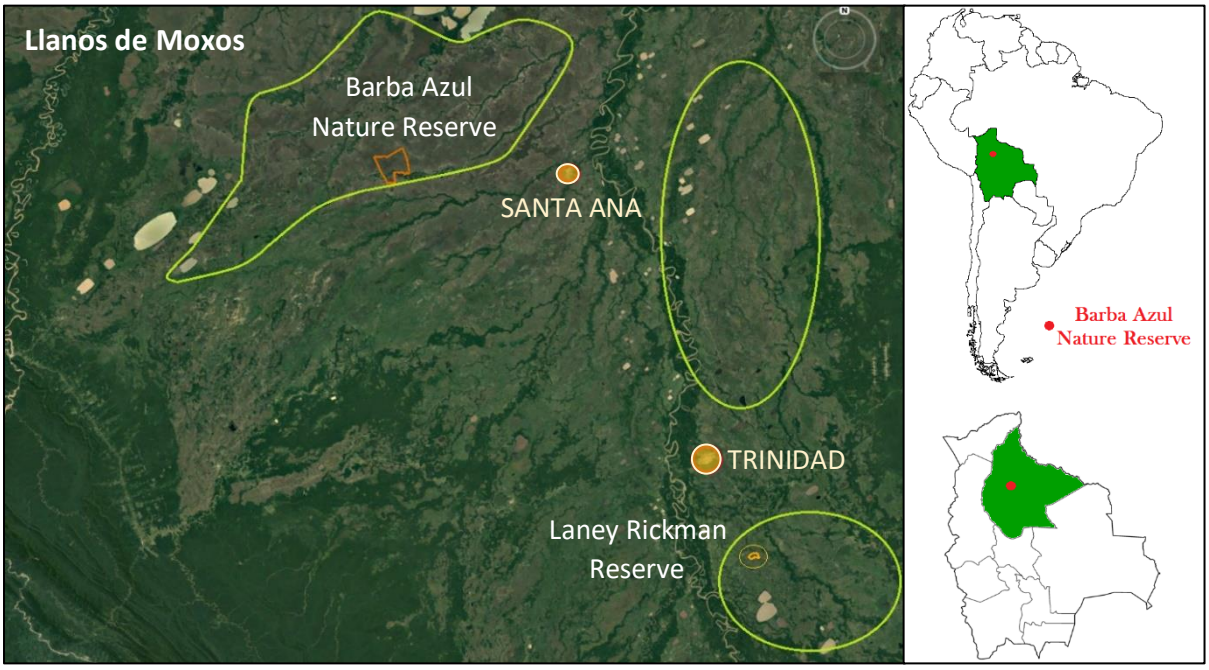

Figure 1. The Barba Azul Nature Reserve is located in the north of the Llanos de Moxos, 75 kilometers west of Santa Ana de Yacuma and 213 kilometers northwest of the newly created Laney Rickman Blue-throated Macaw Reserve. Armonía protect vital Blue-throated Macaw habitat in 2 isolated subpopulations (estimated Blue-throated Macaw subpopulation range indicated in light green circles).

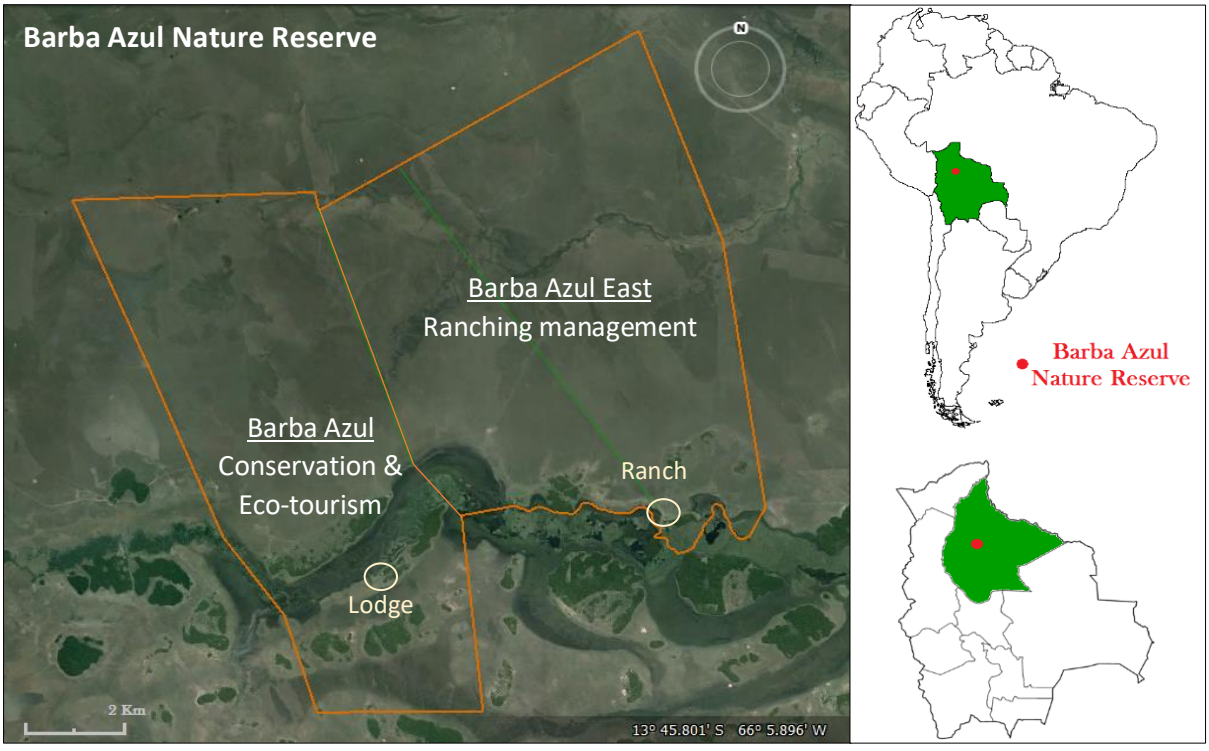

Figure 2. The Barba Azul Nature Reserve is subdivided for two main land-use zones: Barba Azul (6,000 ha) designated for ecotourism and conservation; Barba Azul East (5,000 ha) designated for sustainable cattle ranching and conservation. The Barba Azul lodge is located south of the river Omi containing 4 private cabins, field station and dining facility. The Barba Azul Ranch is located north of the river Omi where all ranching activities are implemented.

2. Introduction

Armonía's Barba Azul Nature Reserve started 2019 with exciting Macaw news. Three pairs of Blue-throated Macaws were observed investigating our newly placed nestboxes (front page), and were seen exploring the cavities, chasing each other from the boxes. This investigative behavior is very promising, generating high hopes they will breed for the first time in Barba Azul. Hopefully we will have the same nestbox success as in the Laney Rickman Reserve (please read the Laney Rickman Reserve nestbox success article: https://bit.ly/2Y3nFpu).

Also, 131 Blue-throated Macaws were counted in May during the weekly monitoring activities. This is the second highest count ever (155 in September 2017) and by far the highest count for the month May. In previous years only around 65 individuals were counted so early in the year, while usually large congregating numbers are observed in August and September.

We would like to welcome three new staff members pushing Armonía's sustainability and conservation programs. Laura Velarde (fig. 3) is our new Eco-tourism Coordinator and started in March promoting our reserves and coordinating all tourism components. Her position is supported by American Bird Conservancy and March Conservation Fund (LARSI).

Figure 3: Laura Velarde is Armonía's new tourism coordinator, visiting together with Tjalle Boorsma (Conservation Program Director) the Barba Azul Nature Reserve. Picture taken by Bennett Hennessey.

In April Armonía contacted Luz Mercado (fig. 4), managing the Blue-throated Macaw Conservation Program, searching for new breeding sites and engaging ranchers in sustainable land-use practices. Her work is part of a Birdlife Tokyo program supported by the TOYOTA grant. Additional support is received from Vogelbescherming Netherlands.

Figure 4: Luz Mercado (left) is Armonía's new Blue-throated Macaw Program Coordinator, visiting together with Luis Miguel Barbosa (right) ranches neighboring the Barba Azul Nature Reserve to explain the importance of habitat protecting and responsible ranching. Picture taken by Carlos Roca.

Last but not least, Edson Lopez (fig. 5) also started in April and will implement the Barba Azul initial cattle herd and managing Armonía's best practices ranching program. The ranching program in Barba Azul East is supported by American Bird Conservancy, March Conservation Fund (LARSI) and the US Fish and Wildlife Service (Neotropical Migratory Bird Conservation Act).

Figure 5: Edson Lopez (right) is Armonía's new ranching coordinator, initiating Armonía's first cattle herd and implementing best practices ranching in Barba Azul East. Luis Miguel Barbosa (left) and Hernan Lopez (middle). Picture taken by Tjalle Boorsma.

The start of 2019 was also marked with extreme flooding (fig. 6). Water levels were significantly higher in comparison to the last 5 years, preventing planned nesting sites searching in the region where Armonía discovered breeding macaws in 2017. To overcome this setback, a larger team will search for nesting macaws in the next breeding season.

Figure 6 (A & B). Extreme flooding condition in the Barba Azul Nature Reserve, comparing the 2018-2019 rainy season (A) to the 2016-2017 rainy season (B). Picture A was taken on the 3rd of February 2019 and picture B on the 9th of March 2017. According to the Barba Azul Nature Reserve field staff, flooding levels increased further lasting until mid-March. Pictures were taken from the same object (Aliso trees) though have a slightly different angle. Pictures taken by Tjalle Boorsma.

3. Barba Azul Nature Reserve 2019 Goals

For 2019 we will continue to conduct protection, research, monitoring activities and working towards the sustainability of the Barba Azul Nature Reserve. We have set the following goals to ensure a continuous development of Barba Azul.

1. Establish solar electricity system

2. Complete raised firebreak system with backburns (Barba Azul North & South)

3. Complete tourism infrastructure
    - New water tank with filtration system
    - Underground electric wiring
    - Complete interior design cabins
    - Complete trail system and signage
    - A multi-resource bird feeder attraction

4. Complete cattle ranching infrastructure (Barba Azul East)
    - Complete worker house, deposit area and roofed tractor parking
    - Complete corral improvements (gathering pens & gates)
    - Establish herd of 500 head of cattle

5. Establish 7-kilometer live fencing

6. Stocking rate experiment to study livestock/Buff-breasted Sandpiper relationship

7. Camera trap monitoring system in each habitat type

8. Research
    - Blue-throated Macaws (3) with GPS tracker
    - Continue savanna habitat research
    - Continue Buff-breasted Sandpiper monitoring
    - Fenced exclusion zones in each habitat

Figure 7. Giant anteater *(Myrmecophaga tridactyla)* along the cerrado trail in Barba Azul Nature Reserve: Kasper Alberda

3. Progress Summary

Establish solar electricity system

International Conservation Fund of Canada and American Bird Conservancy were able to fully fund the installation of solar system this year (24 panels for a 5kWp system). A contract was signed with ERA (Energia Renovable Alternativa) from Santa Cruz de la Sierra who will place the solar system in Barba Azul in the beginning of August and re-direct all electric wiring underground. A pre-visit is planed for mid-July to schedule all activities to place the solar system. A solar system, being better for the planet, will also provide day round electricity as well as radically assist the complications of bring fuel to Barba Azul during the flooding season.

Complete raised firebreak system with backburns (Barba Azul North & South)

Firebreak creation and maintenance will start by mid-July when soil conditions are sufficiently dry. Tjalle is coordinating with Fundación Amigos de la Naturaleza (Bolivian conservation institution and experts in fire management) to visit Barba Azul in July to implement backburns (low-fuel-load areas along the established firebreaks) to assure impenetrable firebreaks. Jo kingsbury, fire expert doing her PhD in Barba Azul, will also be present and assist during these activities.

Complete tourism infrastructure

- New water tank with filtration system
  With the financial support from International Conservation Fund of Canada we will place a new water tank, including a filter system to assure clean drinking water, which will stop us having to buy plastic bottles of water. These activities will take place when soil conditions are sufficiently dry to transport materials to Barba Azul (August).

Figure 8. Barba Azul Nature Reserve dining facility welcoming visitors to explore the amazing Llanos de Moxos of Bolivia: Tjalle Boorsma

- Complete interior design cabins
  With the financial support from International Conservation Fund of Canada we are also able to finish all cabin interior design and deck constructions around the cabins. This will complete all cabin related improvements. We will combine the purchase and transportation of cabin furniture with the dining facility furniture, planned for August.

- Complete trail system and signage
  Thanks to American Bird Conservancy and March Conservation Fund (LARSI) Laura Velarde, Armonía's new tourism coordinator is working on local signs within the reserve presenting all trail systems. Our main effort is extending the reserve's Cerrado trail system along the main forest island of Isla Barba Azul, the most important foraging site for the Blue-throated Macaws.

- A multi-resource bird feeder attraction
  We are experimenting with a new photography friendly feeder design that will attract birds to the newly constructed dining facility. This design (fig. 9) holds a branch in which food is placed in little holes on the backside. When taking pictures while sitting at the dining facility, the food is not visible and the birds appear to be sitting on a natural branch. The branch is provided with a cone-shape protector to prevent rodents from reaching the bird food (a common problem with bird feeders). A small bush will be placed in front of the holder for camouflage.

Figure 9. Photographer friendly feeder, mimicking a natural branch with small cavities filled with food for birds. This design was placed near the new dinning facility to attract birds. Picture taken by Tjale Boorsma.

Complete cattle ranching infrastructure (Barba Azul East)

An initial herd of 155 head of cattle will start in October 2019 through the support of American Bird Conservancy, March Conservation Fund and the US Fish and Wildlife service (Neotropical Migratory Bird Conservation Act). With their support main ranching infrastructure like paddock fencing, corral and firebreaks have been established.

These initial conditions form the basis in which Armonía will continue with the second phase of the program, implementing a large herd to meet governmental requirements and assuring sufficient income to make the program profitable to meet reserve sustainability. For this an investment plan was written (June 2019) to purchase reproductive livestock, rotational livestock and covering exceeding operational costs at the start of the program. The investment includes:

- Purchase of 630 reproductive livestock in 2020 (600 cows and 30 bulls)
- Purchase of 425 steers (castrated male bovine) for rotational livestock management (12 months fattening period). Purchase of steers: 200 in 2020; 75 in 2021; 75 in 2022; and 75 in 2023.

Figure 10. Responsible ranching assures that beef production and habitat conservation go hand in hand. Threatened species that benefit from these practices are for example the Cock-tailed Tyrant (*Alectrurus tricolor*). Picture taken by Harry Lavelle.

Establish 7-kilometer live fencing

This World Land Trust program is work in progress. We are struggling with the survival rate of the Aliso tree (*Vochysia divergens*). In July, Tjalle Boorsma and Marc Meeuwes (Dutch volunteer) will study the success rate of planted Aliso trees and start trying to plant different species to evaluate the best live fencing method to meet our goals. The extreme rainy season caused flooding in areas where trees were planted and might not have survived the extreme 2018-2019 flooding season.

Stocking rate experiment to study livestock/sandpiper relationship

This program will be set in motion by September 2020. Armonía will buy the initial herd of 155 head of cattle in October 2019 right after the Buff-breasted Sandpiper migration period. This because October is the best month for buying one-year old healthy livestock.

Camera trap monitoring system in each habitat type

Alba Fernandez, a graduated master's student from Spain, started her volunteer work studying small to medium sized mammals in March. She returned from Barba Azul in July and will present her results and drafting a paper that we would like to publish. She compared different gallery forest as well as different age classes of savanna for mammal's diversity and abundance. Her camera trap locations will be used for long term monitoring.

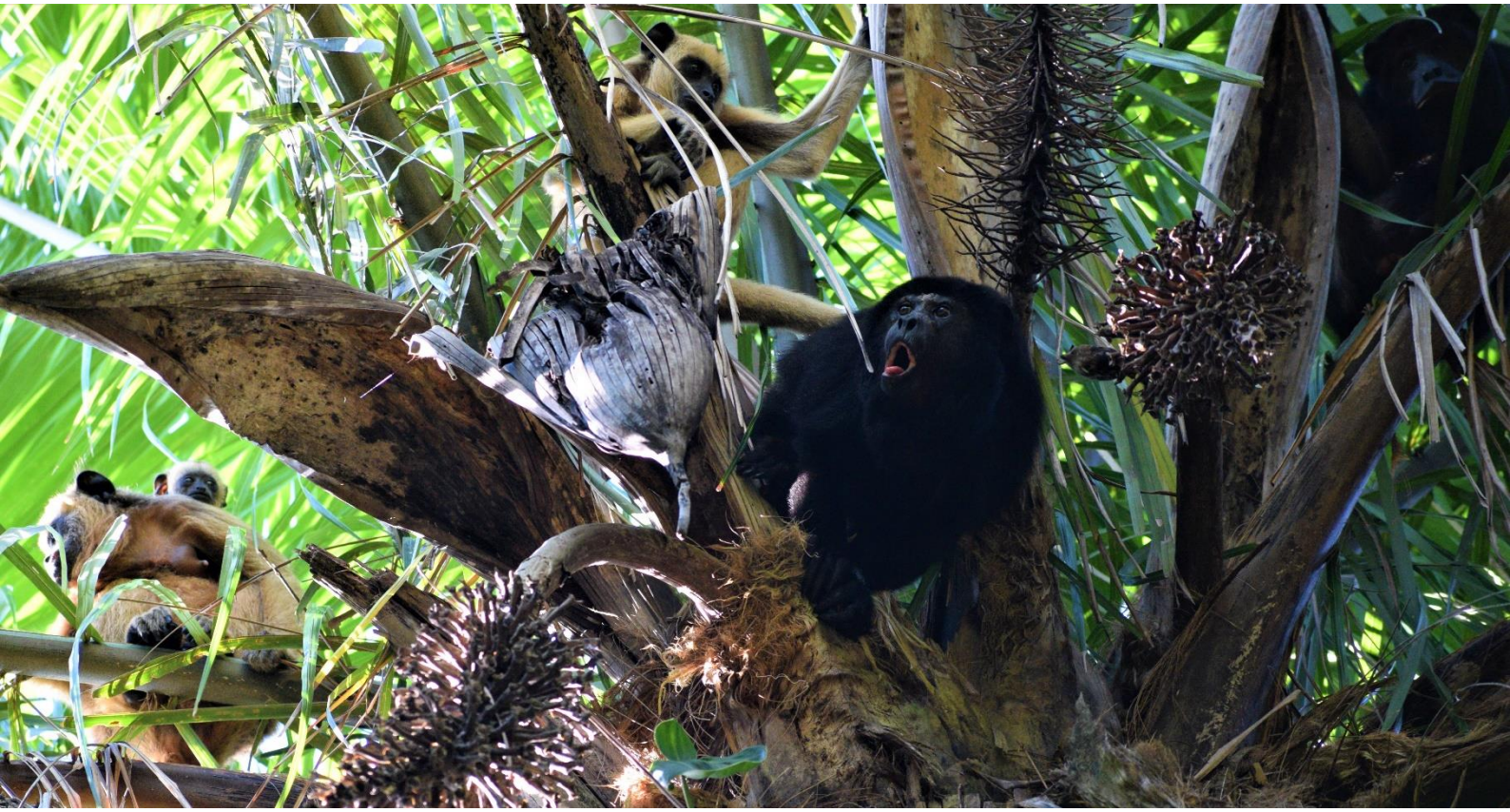

Figure 11. Black Howler Monkey family observed during a mammal study executed by Alba Fernandez. The results gathered during her study are drafted into a scientific paper. Picture taken by Alba Fernandez.

Scientific Research

- Blue-throated Macaws (3) with GPS tracker
  Lisa Davenport (USA) and Lucas & Luciene Carrara (Brazil) will visit Barba Azul Nature Reserve around mid-August to continue the work to capture 3 Blue-throated Macaws for the GPS study that was funded by American Bird Conservancy. Lucas and Luciene have worked for over 8 years capturing Hyacinth Macaws in the Pantanal of Brazil and according to them "have never failed capturing macaws". With this hopeful message we will continue these efforts. We placed artificial perching sites to capture the birds which have been used on a regular base (fig. 12).

Figure 12. Blue-throated Macaws using the artificial perching sites where experts will attempt to capture macaws to place GPS trackers to study their local movement patterns and discovering their breeding sites. Picture taken by Kasper Alberda.

- Continue savanna habitat research
  Jo Kingsbury traveled to the Barba Azul Nature Reserve in July to continue her savanna age class study, where she is investigating bird diversity and abundance along the cerrado-savanna gradient, affected by fire and livestock grazing. She will remeasure all the plots that were burned in a controlled manner in 2018, looking at plant and bird diversity recuperation between unburnt and burnt plots.

- Continue Buff-breasted Sandpiper monitoring
  Tjalle visited Cochabamba in June to prepare the 2019 Buff-breasted Sandpiper monitoring team, a program supported by the Neotropical Migratory Bird Conservation Act. The team leader and members were selected from the Cochabamba University and are trained by Marcia Salvatierra (2014, 2017 & 2018 team leader) to implement the new monitoring protocol. Also, the monitoring will be extended by two more weeks and will cover the entire month of September. The Buff-breasted Sandpiper results will be presented by Tjalle during the WHSG meeting in Panama City (October 2019).

Master Research Program

A total of 5 master students visited the Barba Azul Nature Reserve for their thesis projects (4 students from the Wageningen University and 1 from the Imperial College London).

Motacu Regeneration

Christiaan Spencer (NL) studied the regeneration of Motacu (*Attalea princeps*) in permanent sample plots established in 2016. He looked at a wide range of factors determining the survival rate of seedlings, including the impact of bruchid beetles on the germination and recruitment capacity of Motacu. Therefore, he cracked open over 400 seeds to study beetle infestation.

Blue-throated Macaw

Tiemen van Engelenhoven (NL) studied the difference in group composition, group size and perching site preference of two most abundant Macaw species in Barba Azul: Blue-throated Macaw vs Blue-and-Yellow Macaw.

Small and Medium Sized Mammals

Kasper Alberda (NL) looked at how differences in landscape, anthropogenic disturbance and forest patch quality affect the diversity and abundance of small to medium sized mammals. He placed camera traps in the permanent sample plots that were established in 2016.

Forest Composition

Michon Fleer (NL) studied the forest composition of non-palm species in the same permeant sample plot. Over the years many different types of data have been collected in these sites to evaluate which factors drive the forest composition in Barba Azul Nature Reserve forests.

Best Practices Ranching

Luciano Simonetti (UK) conducted face-to-face interviews with around 40 ranchers to better understand actual ranching practices and study the willingness to move towards more sustainable practices. Luciano was partially assisted by Luz Mercado visiting neighboring ranches of the Barba Azul Nature Reserve. The first results of the study show that all the participants perceive positively the initiative on sustainable cattle ranching. The majority of the respondents would adopt specific management practices that benefit biodiversity, such as rotational grazing to improve forage growth and fencing forest island to allow tree regeneration. This knowledge is of crucial importance for Armonía to further initiate an Alliance between ranchers and conservation institutions to protect habitat through responsible ranching.

Figure 14. Master students from Wageningen University (Netherlands) conducting their thesis projects in Barba Azul Nature Reserve. All corners of the reserve have been studied, including the small Motacu dominated forest islands in flooded savanna habitat of the Tiniji river system. Picture taken by Christaan Spencer.