

Uncovering life history traits and conservation strategies for the Golden Swallow, *Tachycineta euchrysea*, a threatened and endemic passerine on the island of Hispaniola

2012 Field Season Report



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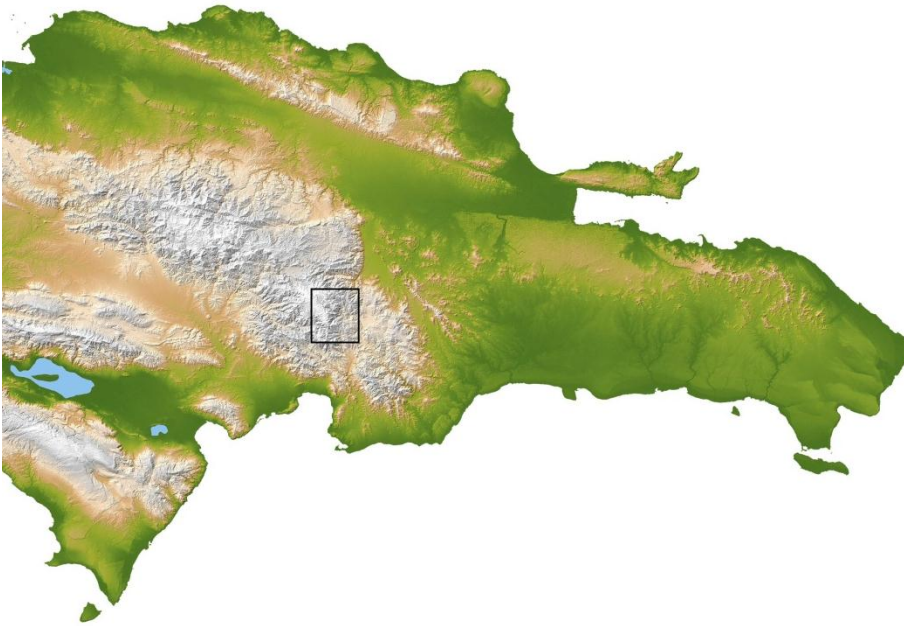
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Abstract

In 2008, nest boxes were erected in the Cordillera Central of the Dominican Republic in an effort to attract a returning population of breeding Golden Swallows, an endemic and threatened passerine declining in numbers for unknown reasons. Four years later, with increasing return rates to the nest boxes, I proposed a life history and conservation project as a graduate thesis to Cornell University and the National Science Foundation, both of whom were receptive to the idea. In April of this year I spearheaded the effort to work intimately with this species for the first time, and with the help of an Argentinian collaborator named Marisol Mata, we spent three months in the high altitude, remote pine forests of Parque Valle Nuevo where we were able to document the reproductive strategies of the Golden Swallow and begin implementing that information into monitoring and educational outreach programs. The next three years of the project show very promising signs of Dominican student involvement, extensive collaborations with an array of conservation initiatives, and expansion into other mountain ranges.

Field Season At-a-Glance



Dates:
April 18th – July 21st, 2012

Team Members:
Justin Proctor and Marisol Mata

Site Location:
Parque Nacional Juan Bautista Pérez
Rancier (Valle Nuevo)
Cordillera Central, Dominican Republic

Target Species:
The Golden Swallow
(La Golondrina Verde)
Tachycineta euchrysea

Boxes: Currently 88 boxes, many of which need replacement, spread over 5 micro sites

Nesting: 41 pairs of nesting GOSW

Eggs: First egg laid on April 30th; eggs laid continuously achieving a clutch of 2-4, with average of 3

Average egg morphology: Length – 18.34mm, Width – 13.15mm, Mass – 1.70g

Incubation: Strictly performed by female; range of 17-21 days with average of 17.78 days

Average incubation bouts of 9.32 minutes

Fledging: Occurred when chicks were between 25 and 27 days in age, average of 25.875 days

Never seen returning to nest box to pass the night; seen perched and preening on pine branches

Adults: Lightweight aerial insectivores threatened (IUCN Red List) and endemic to Hispaniola

Trapped 2 males and 41 females

Average male morphology: Head-bill – 25.58mm, Wing – 116mm, Mass – 11.32g

Average female morphology: Head-bill – 26.1mm, Wing – 110.07mm, Mass – 13.21g

Migration: Currently unknown; hypothesized that population descends in altitude during harsher winter months

Predation: Largest threat posed by two invasive species of rats

8 nests lost due to rats

Greatest Threats to GOSW: Habitat loss, immature forest, woodpecker hunting, island in the sky effect, and invasive predators

Project Background

Nearly two years ago, I found myself becoming intimately involved with the *Golondrinas de Las Américas* project, a hemisphere-wide avian life history study on the breeding ecology of *Tachycineta* swallows under the direction of Cornell University's Dr. David W. Winkler. I joined the project as a field intern, but shortly thereafter, became responsible for overseeing the logistics, scientific protocols, and international collaborations for the program. I eagerly awaited an opportunity that would allow me to couple the life history experience I had been gathering with my greater passion of conservation. When it did, I took initiative to spearhead the project and propose it as a graduate thesis through both the Natural Resources and Ecology & Evolutionary Biology Departments to begin in 2012 at Cornell University.

Work conducted between 2008 and 2011 by Cornell PhD student Jim Goetz and biologists within the Dominican Republic including Jesus Almonthe and Esteban Garrido was effective and successful in attracting a returning population of Golden Swallows to artificial nest boxes within Parque Nacional Valle Nuevo, Dominican Republic. In the Spring of 2012, with the help of Cornell's Lab of Ornithology's Neotropical Conservation Initiative Coordinator, Eduardo E. Iñigo-Elias, we were able to obtain a generous financial donation from the MacArthur Foundation to send a small team down to the Dominican Republic in order to continue and expand the study on the Golden Swallow.

Research Team

This year I was joined by a veteran field biologist to the *Golondrinas de Las Américas* Project, Marisol Mata Huertas. Marisol comes from San Miguel de Tucuman, Argentina, and is currently completing her Bachelors in Science from La Universidad Nacional de Tucumán. Marisol is tri-lingual, including English, Spanish, and Portuguese, while a distinguished honors student within her university. She was chosen for the Golden Swallow Team based on her outstanding work ethic and accomplishments with swallow research in the past as well as her ambition to become a full-time investigator with this project. Marisol was a key player in laying the groundwork for the upcoming years of work in the Dominican Republic and continues to be active in all aspects of the project. I cannot thank her enough.



Parque Nacional Juan Bautista Pérez Rancier

Locally known as 'Valle Nuevo,' this park was decreed a Protected Area under the category of Scientific Reserve in 1983 and later became a National Park in 1996. The park, giving birth to an estimated 769 rivers across the Dominican Republic, has been deemed 'The Mother of Waters,' and lies in the extreme eastern zone of the Cordillera Central. The park boundaries continue to be amplified, currently containing some 910 square kilometers in which had already resided nearly 3,500 people within 20 communities. It is currently defined between 18° 36' 10" and 18° 57' 52" north latitudes and 70°26'56" and 70° 51' 44" west longitudes. (1) (2)

The park is overseen by the Ministerio de Medio Ambiente y Recursos Naturales. A visitor center as well as the surrounding 80 square kilometers in the southern region of the park were built and are co-managed, respectively, by Fundacion Propagas. One mainly north to south running dirt road transects the park, while dozens of smaller dirt roads diverge off to small communities and areas of interest. At both ends and in the middle of the park lie 'casetas,' permanent buildings occupied by park guards and military personnel responsible for maintaining peace and upholding the rules of the national park.

There are currently 43 reported species of birds composing 12 orders and 22 families. From these, 17 species are endemic, representing 63% of the total number



of endemic avian species in Hispaniola. Eight of these endemics, according to the IUCN, are threatened, including the Golden Swallow (*Tachycineta euchrysea*), el Perico (*Aratinga chloroptera*), Cao (*Corvus palmarum*), and el Pico Cruzado (*Loxia megaplaga*). (3)

A thick grass, Pajón (*Danthonia domingensis*) and Pino Criollo/Hispaniolan Pine (*Pinus occidentalis*) trees dominate the majority of high-altitude plateau, though a series of devastating fires throughout the park in the 80's and 90's leave us in many places with vast expanses of immature forest. Elevations range on average from 1900m to 2400m above sea level, with the highest local peak Alto Bandera at 2,842m. Average daily temperatures in the summer are around 20° Celsius while cold nights in the winter months dip below freezing, causing ice but rarely snow. (1)

Logistics

Lodging

There are very few options for long-term lodging within Parque Valle Nuevo. We were fortunate to find Villa Pajon, an ecolodge owned by the Guzman family on the north end of the park. Here there are seven cabins of varying size and capacity, along with a main dining hall and caretakers' residence. On a monthly basis, we rented a small, one-bedroom cabin complete with a kitchen.

Other lodging options include basic dormroom-style bunks at the Valle Nuevo *caseta* as well as brand new rooms adjacent to the Visitor Center at the south end of the park. This latter option may serve us in future years when we hope to split a team of four into two groups monitoring swallows on opposite ends of the park.



Transportation

Securing durable and reliable transportation worthy of the crude road that transects the national park was certainly a challenge. Making decisions on a limited budget, we rented a Suzuki jeep from Tomas Batista and his family whom reside in Constanza after learning that rental prices from large companies for long durations of time are simply unaffordable. The jeep was capable of running with either propane or gasoline, a welcome option when the cost of propane is one-half that of gasoline. Tomas was incredibly helpful when breakdowns occurred and allowed us to use other, more appropriate vehicles within his fleet when we needed to travel between towns on pavement.



Resources

The closest town, Constanza, lies on a valley floor some 17km (50 minutes by vehicle) to the north. Here, one can obtain everything from hardware to groceries at a reasonable price. We will be using a bamboo school on the outskirts of Constanza as a workshop for constructing some 300 additional boxes during January of 2013. The Ministerio de Medio Ambiente y Recursos Naturales has an office in the northwest corner of the town.

Local *gua-guas* that summit the mountains into Valle Nuevo on a near-daily basis can be a convenient option for buying supplies without having to make the trip into Constanza.

The Golden Swallow



Facts

The Golden Swallow is better described with its Spanish common name, La Golondrina Verde (The Green Swallow), as the iridescence on the crown, nape, mantle, and back is more green than gold. These swallows are aerial insectivores properly equipped with long wings that allow them to hunt for prolonged periods of time while making extremely fast adjustments in flight patterns in order to catch their food. Incapable of excavating their own nest cavities, Golden Swallows are dependent on nesting within natural cavities in earthen banks or those created in snags by woodpeckers.

Scientific Classification:

Class: Aves
Order: Passeriformes
Family: Hirundinidae
Genus: *Tachycineta* (formerly *Kalochelidon*)
Species: *euchrysea*

The nominate subspecies of GOSW on the island of Jamaica is thought to have been extirpated, having last been seen in 1989. The remaining race, *sclateri*, can be found prominently in the Cordillera Central and Sierra de Bahoruco mountain chains of the Dominican Republic and within the Massif de la Hotte and Massif de la Selle in Haiti. (4)

Study Site

The GOSW breeds in the Cordillera Central of the Dominican Republic therefore creating a unique opportunity to study a *Tachycineta* swallow that is not only a tropical mountain breeder, but one that is confined to an island. Birds at higher elevations are expected to produce smaller clutches and fewer broods, while exhibiting longer periods of incubation and increased parental care (5). Meanwhile, as distance from the equator increases, we expect larger clutch sizes (6) and decreased number of nesting attempts. Information on specific life history differences between island and mainland breeding is limited (7), though we expect a trend in island birds to exhibit greater juvenile survivorship resulting from higher parental investment and more limited dispersal.

Our study site is located within Parque Nacional Juan Bautista Pérez Rancier (Valle Nuevo). The preferred habitat of the Golden Swallow within this park appears to be man-made clearings where habitual wet depressions occur.

The highest concentration of swallows was found at a site where a run-off stream stays wet even during the driest summer months. We also noticed relatively higher insect abundance here.



Effect of Climate

From our arrival in mid-April until the end of May, 12 hours or more of rain per day was not uncommon. The swallows chose this time to build nests, lay eggs, and begin incubating them. Over the course of less than a week in late May, the weather changed completely, becoming drier with each day that passed. As the rains subsided and the insects rose in high numbers, the chicks began to hatch. The timing of the breeding season seemed appropriate. We noted that chicks hatching during the change from wet to dry season were able to grow quickly and fledge before the insect abundance plummeted with increasing drought-like conditions. Those swallows that laid eggs later or had to re-lay a clutch due to broken eggs were pushed into a time period of non-conducive conditions for growth. We found many nests during this time with young, dead chicks that appeared to have been abandoned. We hypothesize that food abundance was not high enough for the adults to sustain their chicks thus forcing abandonment.

Cold nights, at times hovering around 2 degrees Celsius, may have contributed to chick loss. Daily temperature fluctuation increased as the summer progressed. We believe it critical to develop a box design that accounts for these extreme differences.

Protocols

This was our first field season working with the GOSW. Keeping in mind the vulnerability of the population, their newly found adaptation to nest within our artificial nest boxes, and our extremely limited knowledge of their life history, we made it priority to minimize disturbance as much as possible. Much of our new knowledge of the bird comes from observation alone, though we were able to collect significant information on egg, chick, and adult morphology.

Nest Boxes

There are currently 88 boxes spread across five sites within the national park. Two of these boxes are attached to head-high metal poles, while the remaining 86 are attached to trees with metal cable, anywhere from 2 to 3 meters above the ground. At this point in time, it is necessary to have a ladder in order to check a nest box.

A large majority of the next boxes are ready for replacement. The wood has become brittle, making even minor repairs risky in the likelihood of destroying the entire box. It may be necessary to change the current box design to better match the climate and this species of swallow. Most importantly we need to account for heavy rains in the early summer that are inundating the nests with water as they are being built. Secondly, the height of the box and thus the large volume of space inside seems unnecessary with a swallow that builds such a small nest for a clutch of three chicks. As trees grow and expand, the metal cable attaching the box to the tree becomes stressed, often pulling off the back wall of the box and potentially strangling the tree. For these reasons, we are ready to rebuild and relocate all boxes onto metal posts adjacent to their original locations in order to increase box life.

Between April 18th and July 21st of 2012, 53 boxes (60%) were active at least once.



Nest Building

Nests were already being constructed upon our first box check on April 18th, 2012. As old nests had never been removed, it was obvious which boxes were preferred and which had never been used. The Golden Swallows build nests ovetop of old nests but are deterred by wet box interiors as well as high katydid densities.

The construction of the nest begins with an almost ‘log-cabin’ formation of pine needles from the abundant Hispaniolan pine species. The pine needle base ranges from approximately 3 to 8 centimeters in height, after which hanging lichen is added to the top and inside cup portion of the nest. Feathers are difficult to come by in these high altitudes where the largest bird, by far, is the Red-tailed hawk, and no Anseriformes species are to be found. At most, one pair of swallows found and added three feathers to their nest, two of which came from domesticated poultry (chickens) nearby.

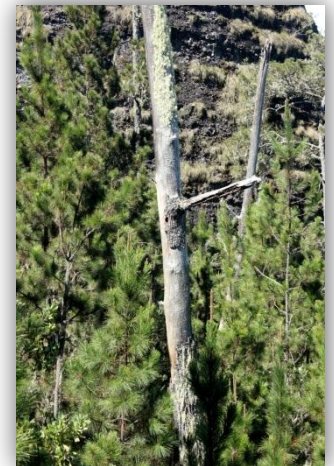
Adults were very responsive in gathering white feathers offered to them, often battling each other aerially until one could return the feather safely to the box. The instinct to line the nest cup with feathers is strong as in other *Tachycineta* species, yet few are to be naturally found within the park.



Natural Cavities



One of the greatest limiting factors in this region is the lack of natural cavities. After extensive logging in the past and a series of unfortunate forest fires in the 1980's and 1990's, the landscape is now dominated by young pines. In addition, local communities are raised engrained with the notion that the only woodpecker (Hispaniolan Woodpecker, *Melanerpes striatus*) within Parque Valle Nuevo is a threat to their agriculture and may still be killing this species upon encountering it around the crops. These factors limit natural cavity abundance and will be vital educational outreach themes for this project in future years.



We secured photo and video of GOSW nesting inside of abandoned buildings and suspect they are also using holes in small earthen banks dispersed throughout the park. At least three pairs of GOSW were seen

foraging and alarm calling near a mountain summit in the northeast corner of the park where large conglomerations of boulders were prevalent as well as several old, dead snags. Swallows can also be seen in significant numbers around the summit of Pajon Blanco where a park guard station accompanies an active fire tower. I hypothesize that neither fire nor man has been able to access many of the older pines and snags near the mountain summits, creating small ‘islands in the sky’ where GOSW may be finding limited, but available nesting options.

Egg Laying

The first egg laid this season occurred on April 30th. Eggs are laid continuously each day, with one egg per day, until clutch completion. Eggs are completely white, without spots or other markings, and extremely delicate.

Incubating females are very likely (more so than other *Tachycineta* species I have worked with in the past) to defecate over the eggs when we open the box, even if she does not obviously startle or move from the nest cup. Because tiny pores exist in the shell allowing the embryo to breathe, fecal matter can seal those pores and/or introduce bacteria into the egg, potentially making them less viable. After learning about this response to our presence, we have reduced our number of visits to the nest box on both ends of the incubation period. Eggs that have been defecated upon can either be left inside the nest in hopes that the female continues to incubate them and they hatch or the eggs can be removed in hopes that the female will quickly decide to lay a new clutch. We pursued each of the two strategies and both, at times, were successful. We did not visit the box each day during egg-laying, but instead visited the box on day 3 and 4 of egg laying

in order to collect morphological data including length, width, and mass. Because of this, the order of eggs laid is unknown.

Clutch size ranges from 2 to 4 eggs, with clutch sizes of four being more common than that of two. The average size clutch is three. Greater detail can be found in the following table:



	Length (mm)	Width (mm)	Mass (g)
Sample size (n)	127	127	121
Range	15.7 to 20.36	12.25 to 14.0	1.36 to 2.13
Average	18.34	13.16	1.70

Incubation

We use a system in which clutch completion is noted as synonymous for the first day of incubation. However, it was obvious in handling warm eggs that adult females were incubating eggs throughout the laying process. At this time, only the female is thought to incubate eggs. In future field seasons, we will color-mark females early in the incubation stage in order to differentiate them from males during observations.

Incubation data can be found in the table below:

Sample size (n) = 36 nests	Minimum	Maximum	Average
Incubation (in days)	17	21	17.78

We conducted 31 observations during which we noted the amount of time a female spent incubating her eggs. The following table does not take into account the day of incubation.

Incubation Bouts	Shortest	Longest	Average	Per Hour
Range (minutes)	0.5 to >21	7 to >21	4.2 to >21	1 to 9
Average (minutes)	5.98	12.63	9.32	5.1

Subsequent field seasons with more observations will allow us to better understand incubation patterns within this population and how investment by the female may change throughout the incubation period. Furthermore, we will be collecting incubation temperatures from inside the nest cup using small temperature loggers, generating much more detailed information on heat transfer between the female and her eggs.

Chicks

Tachycineta swallows are altricial, in that their young are born blind, helpless, and relatively immobile, thus requiring care from their parents in order to survive. In only one nest did a clutch of four eggs hatch a clutch of four chicks, all which eventually fledged. In the 3 other nests with four eggs, only 3 eggs successfully hatched.

The day in which an egg hatches is synonymous for Day 0 of a chick's life, followed by Day 1, Day 2, etc... As is believed to be true throughout other *Tachycineta* species, all chicks hatch within 24 hours of each other. We therefore assign all chicks in the nest to the same age.

Chicks invest energy in creating a fecal sac, or mucous membrane, around their feces. The benefits of doing so include easier removal of feces from the nest by the parents which in turn leads to a more sanitary nest and healthier chicks. Parents that discard the fecal sacs a significant distance from the nest may also be



eliminating smells that can attract predators (8). Many passerine chicks create fecal sacs until a few days before fledging (9), though we found that GOSW chicks produced fecal sacs through to fledging. Nests were either completely clean of feces after fledging or remaining fecal sacs had been excreted outside the nest cup.

Neither parasites nor fly larvae were ever encountered within the nest or on the chicks.

Chick morphology and growth curves will follow in the next report.

Fledging



In the context of swallows, fledging is the point at which a chick leaves the nest and takes flight for the first time. We never observed chicks returning to rest or pass a night inside of a nest box after fledging, however, fledglings were often seen perched on horizontal pine branches intermittently during feeding. Fledglings appear significantly 'stockier' in flight, with shorter wings and yellow bills.

It can be risky to open nest boxes near to expected fledging dates as startling the chicks could induce the urge for them to leave the box prematurely, often still incapable of flight. We were able to safely obtain the following data:

Sample size (n) = 8 nests	Minimum	Maximum	Average
Fledging (in days)	25	27	25.875

Adults

This *Tachycineta* species is very unique in that adults are never seen perched on the roof of the nest box nor on nearby tree limbs. We speculate that males roost high in the pines at night, while females rest inside the box incubating eggs or chicks. Only females incubate while both parents actively provision chicks.

Behavior towards a predator (in this case, our field team) escalated in the level of aggressiveness as the breeding season progressed. This aggressiveness was exhibited more by increases in alarm calls rather than 'dive-bombing' action seen in congeners such as the Tree Swallow. On three occasions, incubating females emitted a quick, low-pitched 'growl' when we opened the box. One of those females soon afterwards made a movement towards my hand that could be described as a 'charge', though she never made contact. Additionally, adults were often seen 'mobbing' Red-tailed hawks as they glided low around the field sites.



We trapped 41 females, 2 males, and had 3 recaptures from previous years, all of which were female. Females were initially trapped during late incubation; however, after learning of their tendencies to defecate over the eggs, we began to trap immediately after the eggs hatched. All were caught successfully using a 'flap-trap' method. We experienced several problems when we set out to trap males, thus our capture total of only two. The males are very uneasy about entering the box and only remain inside for less than 2 seconds during a feeding bout. This gives an observer very little time to react and activate a 'wig-wag' trap that covers the nest box hole and traps the male inside. Additionally, we were hesitant about replacing many of the broken wig-wags upon recognizing their condition early in the season in fear of altering the nest boxes in such a visible way that could lead to box abandonment by the swallow pair. Furthermore, being unfamiliar with the birds led us to decide not to color-mark the females in order to differentiate

them from the males. These conditions made it impractical to trap males this field season. On two occasions, we went to trap a female and were rewarded with a male instead. Both males were caught on different days at different sites but exhibited identical levels of trauma after being handled for a much shorter time than any females we had caught. Both males, after only two minutes of being handled, lied motionless in my hand for nearly 10 seconds before taking flight. This result was never seen with any of the 41 females.

Morphological measurements can be seen in the following tables. Though a small sample size, take note of the potential differences between male and female adults as well as the strikingly light body mass.

MALES	Head-bill (mm)	Wing Length (mm)	Mass (g)
Sample size (n)	2	2	2
Range	25.45 to 25.7	115 to 117	11.23 to 11.41
Average	25.58	116	11.32

FEMALES	Head-bill (mm)	Wing Length (mm)	Mass (g)
Sample size (n)	41	41	41
Range	25.35 to 26.9	106 to 114.5	11.02 to 14.58
Average	26.1	110.07	13.21

In the following table, we show differences in mass between females that were caught in May versus those that were caught in June. The smaller mass in June may be a reflection of the drier weather and/or lower insect abundance.



FEMALES	May (mass in grams)	June (mass in grams)
Sample size (n)	27	13
Range	11.71 to 14.58	11.02 to 14.08
Average	13.56	12.62

On the 2nd of July, we trapped a female for the second time and decided to mass her. Her first clutch had failed in that the eggs simply never hatched. On the 20th of May, she weighed 14.45g, while 43 days later she weighed in at 11.45 grams, exactly 3 grams less.

Second Attempts

We define a second attempt as to the event of one pair of swallows re-laying a clutch of eggs (either within the same or a different nest box) after abandoning or losing the first clutch. Often times this occurs when the female breaks an egg during incubation, the eggs don't hatch, the nest is predated, or the chicks die due to starvation or weather. During this field season, we had 6 pairs of swallows undergo a second attempt, the majority of which were successful.

Second Clutches

We define a second clutch as to the event of one pair of swallows rearing and fledging a set of chicks and afterwards doing so again within the same breeding season (possibly using the same box again). As of our departure date, July 21st, most adults had left the field sites and there were no signs of a possible second clutch. We are interested in investigating the possibility that adults may lay a second clutch at a different location, perhaps at lower altitudes.

Predation

Eight nests, all within one field site, were lost due to predation by two invasive rat species. Upon arriving at the field site in mid-April, rats were nesting and overwintering inside several boxes. During the following two weeks, one adult in each of two boxes was predated while building/laying. We did not experience additional predation until two months later around the 19th of June, when rats began to enter on a nightly basis a series of boxes that contained chicks or incubated eggs. Having limited options and limited time, we set up traps with poison in order to counter the sudden increase in predation and noticed immediate results.



Relocating boxes to metal poles with predator guards should eliminate predation by rats in the future; however, it may be worth the time to investigate other non-toxic options for extermination.

Migration

Small-scale migration patterns are currently unknown for this population of Golden Swallows. We know that all fledglings and their parents had left the field sites by our departure date of July 21st. We also know that adults arrive prior to our arrival date of April 18th. With the help of local, year-long monitoring programs that we are initiating, we can learn whether or not swallows are present in Parque Valle Nuevo outside the dates of our field season. In the near future, we will be attaching GPS units to swallows in order to determine where they overwinter. This information is valuable in our effort to not only protect the bird during its breeding stage, but also along its migratory path.

Threats to the Golden Swallow

The ecological niche that the swallow occupies is complexly intertwined with the entire ecosystem surrounding it. When one link of the chain fails, so do the rest. In this way, the goal to protect and rebuild Golden Swallow populations has already become something larger, an effort to conserve and sustain the many other abiotic and biotic factors on which the bird depends.

1. Habitat – As communities and agriculture spread across the Dominican Republic, wildlife is forced to either adapt to new conditions or relocate. As an island endemic, the Golden Swallow has even fewer options than migratory birds to escape unfavorable changes to its habitat. The Parque Valle Nuevo Golden Swallow population is currently breeding in one of the more remote areas of the country, though habitat loss from anthropogenic impacts is still of concern.

2. Immature Forest – Extensive logging in the past as well as devastating wild fires in the late 20th century have left the Park with large expanses of immature forest that lack the natural nesting cavities found in more mature stands.

3. Woodpecker Hunting – Local communities fear that the Hispaniolan Woodpecker is a threat to their crops and may still be killing woodpeckers opportunistically. As the only woodpecker in Parque Valle Nuevo, its presence is priceless for the cavities they excavate in trees that later become seasonal nesting locations for Golden Swallows, parrots, and other secondary cavity nesters.

4. Island in the Sky Effect – The current situation justifies a fear that this species is being forced into higher, more remote mountains in order to breed in less disturbed environments (10). A trend of this nature could be devastating as climate and human distribution changes.

5. Wintering Grounds – Even if capable of protecting habitat and artificial nesting cavities for the swallow during the breeding season, we are currently unaware of their yearly movements and what obstacles they encounter outside of the National Park.

6. Predators – The only known predators to the Golden Swallow during the breeding season in Parque Valle Nuevo are two species of introduced rats. We can eliminate their ability to enter nest boxes with specially designed predator guards, though the fundamental problem of their existence within the Cordillera Central is a matter that needs to be addressed in the near future.



Outreach

The future of the Golden Swallow lies directly in the hands of the Dominican people. Our project is meant to act as a catalyst between communities and the environment, using the swallows as a tool to represent larger ideas of conservation, sustainability, and stewardship.

The educational outreach component of the project emphasizes the ecological connections between mature forest stands, healthy woodpecker populations, and cavity nesters (such as the swallow and local parrots). The difficult situation we are facing today in the Dominican Republic with disregard for local fauna as well as habitat loss stems directly from a simple lack of environmental education. The good news is that from school children to university students to local villagers, the people are receptive to the message we bring. There is incredible enthusiasm and ambition by the Dominicans to become involved with efforts to care for their land and its biodiversity.



With the help of Fundacion Propagas, we are eager to begin using the Park Visitor Center as a base for environmental outreach. Here we can bring school groups to spend the weekend learning about ornithology and endangered avifauna. Nearby nest boxes will allow the students to interact with Golden Swallows at a proximity they will have likely never experienced before.

Both the Visitor Center and Villa Pajon Ecodge draw tourists from around the country as well as internationally. These establishments can serve as powerful outposts for guided bird tours that highlight endemics such as the Golden Swallow. Furthermore, the Society for the Conservation and Study of Caribbean Birds (SCSCB) is creating a Caribbean Birding Trail that may draw more attention to Parque Valle Nuevo's avian wildlife amongst the world's birding enthusiasts.

In search of field interns for 2013, we were able to begin presenting our project and future ideas to local university students in the Dominican Republic. I want to give Dominican students that possess an interest in ecology and conservation the opportunity to join our team, to work alongside us in studying the life history of the Golden Swallow, and to have the chance to work with other swallows outside of the DR. I strongly believe that training and interacting with the scientific community on an international level can provide one with invaluable insight that they can bring back and apply to issues within their own country.

Before departing for the Dominican Republic, we created a website completely devoted to the Golden Swallow and the project. The site contains static informational pages as well as a dynamic, rolling blog interface, both designed to keep our goals and progress readily available to anyone interested. The ease at which a fellow scientist or community member can access our results and photos is symbolic to the image we are trying so hard to create – an image of transparency, honesty, and openness to widespread collaboration and involvement. We've currently had more than 4,000 hits.

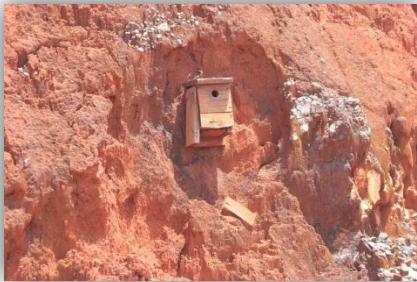


Expanding the Project into the Southwest

At the end of the field season, after the majority of the swallows had fledged and left our field sites, we traveled to the Southwest corner of the Dominican Republic in order to gain a better understanding of the situation with the Golden Swallow population in the Sierra de Bahoruco. In years past, Jim Goetz accompanied by several Dominican biologists was able to anchor nest boxes into earthen walls of abandoned bauxite mines. Here they had seen concentrated swallow activity and nesting occurring within the banks created by the mining process. Jason M. Townsend, Esteban Garrido, and Danilo A. Mejia describe their findings in greater detail in the paper, "Nests and Nesting Behavior of Golden Swallow (*Tachycineta euchrysea*) in Abandoned Bauxite Mines in the Dominican Republic." (11)

Sources led us to believe that very few pairs of GOSW were using the boxes and we concurred this with our visit. Though the swallows had (presumably) left the breeding location by the time we arrived (as our population in Valle Nuevo had), we were unable to find a single box with any trace of nesting material inside. Nearly 50% of the boxes were in unusable condition.

We hypothesize that this population of swallows has access to a greater abundance and variety of natural cavities, leaving our artificial nest boxes unattractive to them at this point in time. The bauxite mines are located between 1000 and 1,425m above sea level, sitting significantly lower in elevation than our other in Parque Valle Nuevo (2300m). Pine forest still appears to dominate the landscape, but we were unable to conduct a thorough assessment of natural cavity availability in the short amount of time we had.



The 2013 field season will have a strong focus on developing a new strategy for attracting this population of GOSW into artificial nest boxes where we can study them more closely. We look forward to continue working alongside Esteban Garrido, Danilo Mejia, Marisabel Paulino, Kate Wallace, and other biologists in the southwest region of the DR in order to develop a life history study and conservation plan specific to this unique region.

Future Objectives

1. To continue studying the life history tactics of the Golden Swallow with emphasis on overwintering geography, adult male morphology, incubation temperatures, and effects of climate. Longer term data sets will be more powerful in depicting the attributes of this swallow, allowing us to make better decisions in applying the information to conservation strategies.
2. To maintain transparency throughout the project. I firmly believe in open communication between researchers and the public as well as the distribution of scientific results to all parties. Furthermore, science, especially of this application, must be a collaboration open to all whom are interested.
3. To engage Dominican students. The fate and success of this project is ultimately in the hands of future scientists, conservationists, and naturalists within the Dominican Republic.
4. To expand the life history study into the Sierra de Bahoruco mountain chain where another population of GOSW has been breeding.
5. To erect hundreds of new nest boxes with varying designs to test for nest box preference. The nest box is our most important tool in this project, not only serving as a breeding location for the swallows, but as the very means of interacting with them. Designing a durable, reproducible box that suits both their needs and ours will reduce disturbance levels while increasing data collecting efficiency.
6. To continue educational outreach on all levels that not only focuses on the Golden Swallow, but also the ecosystem in which it lives.

Friends of the Golden Swallow

Villa Pajon

Located 2300 meters above sea level in the pine forests of Parque Nacional Valle Nuevo in the Cordillera Central of the Dominican Republic, Villa Pajon is a cozy ecolodge focused on bridging connections between local communities, scientific researchers, and the future sustainability of the National Park.

Owners of Villa Pajon, the Guzman family, are excited in offering their knowledge, support, and accommodations to scientists working within Parque Valle Nuevo. We developed a strong relationship with Villa Pajon and appreciate their incredible hospitality and generosity as well as interest in our work. We look forward to working alongside them in drawing awareness for the Golden Swallows and their habitat.

Fundacion Propagas

A foundation created in 2007 to carry out the social responsibilities of Grupo Propagas. The foundation is made up of an active committee, including but not limited to President Doña Pirigua, Eladio Fernandez, Andres Ferrer, and Claudia Catrain. The goal of the foundation is to bridge connections between community and nature, to support and develop projects aimed at recognizing the riches of the land, as well as to denounce acts and causes of predation and devastation towards these natural resources.

Fundacion Propagas recently built a Visitor Center nearer to the southern end of the national park, a valuable tool we can use for educational outreach with the public and school groups. The Foundation is excited about collaborating with the goals of our project in order to build long lasting field sites that can be monitored and studied for many years to come.

With the help of Fundacion Propagas, we have drawn awareness to the need for advanced medical training and supplies within the national park as well as changes to improve local drinking water.

Ministerio de Medio Ambiente y Recursos Naturales



Headquartered in Santo Domingo, the Ministry of Nature has been welcoming and receptive of our project proposal, granting us full permission to conduct our research throughout Parque Valle Nuevo. With the approval of the Ministry, local park guards have volunteered to become involved with the Golden Swallow Project by monitoring swallow activity throughout the year as well as educating the public about our study and its mission.



Additional Acknowledgments

We'd like to thank the following people and organizations for their guidance, kindness, and enthusiasm in helping us to study and protect the Golden Swallows in the Dominican Republic. We thank you and promise to see you soon!

Funding Support

MacArthur Foundation
IDEA WILD
The Florida Ornithological Society
Neotropical Bird Club
PIRE Support
Peter Trueblood

Lab of Ornithology

Eduardo Iñigo-Elias
Jason M. Townsend

Cornell University

Department of Natural Resources
Jim Goetz
Golondrinas de Las Américas Project

David Winkler, Lori Sonken, Maria Stager, Dan Ardia, Caren Cooper,

The Society for the Conservation and Study of Caribbean Birds (SCSCB)

Lisa Sorenson, Ted Eubanks, Holly Robertson

Dominican Field Biologists

Jesus Almonthe, Esteban Garrido, Danilo Mejia, Marisabel Paulino

Villa Pajon EcoLodge

Jose Delio Guzman, Rosa Maria Guzman Higgins, Nicholas Higgins, Gustavo e Ingrid Guzman
Chuchu, Damaris, Rafa, Leticia, Rene, Sasen, Rubia

Parque Valle Nuevo

Guardaparques y Militares
Kaki, Kako y Pinky, Fausto, Jose, Pinto, Moncho y Junior

Town of Constanza

Tomas y Milagros Batista

Sociedad Ornitologica de la Hispaniola (SOH)

Jorge Brocca

Fundacion Propagas

President Doña Pirigua
Eladio Fernandez
Andres Ferrer
Claudia Catrain

Ministerio de Ambiente

Ivan Mota

Museo de Historia Natural

Robert Ortiz, Gabriel de los Santos

Tody Tours

Kate Wallace

Universidad Iberoamericana (Unibe) y UASD

Simón Guerrero



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