



PHOTOGRAPHIC DOCUMENTATION AND SEX-SPECIFIC ATTENDANCE OF NESTING SHINING HONEYCREEPER *CYANERPES LUCIDUS ISTHMICUS*

Francisco Vega-Reyes¹ · Sarah E. Brown² · Amanda Leemann³ · Daniel J. Lebbin⁴

¹Asociación Conservación Osa, Puerto Jiménez, Costa Rica.

²Department of Biological Sciences, Thomson Rivers University, Kamloops, British Columbia, Canada.

³Hog Island Audubon Camp, National Audubon Society, 12 Audubon Rd, Bremen, Maine 04551, USA.

⁴American Bird Conservancy, PO Box 249, The Plains, Virginia 20198, USA.

Email: Francisco Vega-Reyes · pacobd0@gmail.com

Abstract · Little information exists on breeding biology of most Neotropical avian species, particularly for canopy nesting birds. We conducted observations of a Shining Honeycreeper *Cyanerpes lucidus isthmicus* nest from a 30-m canopy tower in tropical wet forest of southern Pacific Costa Rica. Over 26 days, from 4 February to 5 March 2025, we recorded nest visitation and attendance by the nesting pair and obtained the first photographs of the nest and nestlings for this species. The nest was a low cup, placed about 29 m high in the fork of a vertical twig of *Coussapoa villosa*. We recorded most nest visits from 06:00 h to 09:00 h, and only the female incubated. The two nestlings were provisioned mainly by the female, mostly with fruit pulp but also insects. Our observations contribute to knowledge on the breeding biology for a poorly-known species, permitting further meta-analysis to evaluate life-history theory for Neotropical birds.

Documentación fotográfica de nido y asistencia según el sexo para el mielero luciente *Cyanerpes lucidus isthmicus*

Resumen · Existe poca información sobre la biología reproductiva de la mayoría de las especies de aves neotropicales, en particular de las que anidan en el dosel. En este trabajo realizamos observaciones de un nido de mielero luciente *Cyanerpes lucidus isthmicus* desde una torre de 30 m de altura en el bosque húmedo tropical del Pacífico Sur de Costa Rica. Durante 26 días, del 4 de febrero al 5 de marzo de 2025, registramos las visitas al nido y la presencia de la pareja reproductora. Adicionalmente obtuvimos los primeros registros fotográficos del nido y los polluelos de esta especie. El nido consistía en una copa baja colocada a 29 m altura sobre la horqueta de una rama vertical de *Coussapoa villosa*. Registramos la mayoría de las visitas entre las 6:00 y las 9:00 h, y solo se observó a la hembra incubando. Los dos polluelos fueron alimentados mayormente por la hembra, principalmente con pulpa de fruta, pero también insectos. Nuestras observaciones contribuyen al conocimiento sobre la biología reproductiva de una especie poco conocida, lo que puede contribuir en futuros metaanálisis para evaluar la teoría de la historia de vida de las aves neotropicales.

Keywords: Avian reproduction · Breeding behavior · Canopy birds · Cup nest · Neotropical birds

INTRODUCTION

Neotropical birds are highly diverse yet poorly studied in the case of many species. Filling knowledge gaps on breeding biology of Neotropical birds is a research priority (Fierro-Calderón et al. 2021; Soares et al. 2023). Xiao et al. (2017) estimated that there is reliable and complete breeding information for only 20% of Neotropical bird species and over 40% have partial breeding information. Establishing baseline avian breeding parameters and tracking changes in behavior is critical considering recent anthropogenic disturbances and climate change (Fierro-Calderón et al. 2021; Perez et al. 2023). Canopy birds in particular present a major challenge, as fewer observations and studies can be conducted due to the inherent difficulties accessing this forest strata (Walther 2003).

An example of understudied, canopy specialist, Neotropical birds are the four species in the genus *Cyanerpes*, which includes the Shining Honeycreeper *Cyanerpes lucidus*. Only a single nest for this species has been previously described (Skutch 1972), with no standardized records on parental activity, nor photographic documentation. Skutch (1972) reported an incubation period of 12–13 days and a nestling period of 13–14 days for the Shining Honeycreeper in Pérez Zeledón, in southern Pacific Costa Rica. Skutch (1954) found similar incubation (12–13 days) and nestling (14 days) periods for the Red-legged Honeycreeper *Cyanerpes cyaneus* around San Isidro El General, on the Pacific slope of Costa Rica. Nesting records for the Purple Honeycreeper *Cyanerpes caeruleus* only provide information on egg characteristics and nest location (Pinto 1953). Finally, no information currently exists on any aspect of the breeding biology of the Short-billed Honeycreeper *Cyanerpes nitidus*. Given the limited information available on nesting by this group of canopy specialists, we provide the first photographic records of a Shining Honeycreeper nest, and report data from standardized observations on nest structure, breeding behavior, and sex-specific nest attendance.

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METHODS

Study site. We conducted all observations from a 30-m canopy tower in the Osa Conservation Campus (8°24'19.3176"N, 83°20'11.5686"W), located in an old growth tropical wet forest on the 1,093 km² Osa Peninsula, Costa Rica (Kohlmann et al. 2010). The region has a network of natural protected areas, including two national parks (Corcovado National Park and Piedras Blancas National Park), and is considered one of the most Carbon-dense forests in the World (Taylor et al. 2015). Vegetation cover comprised secondary forest, old-growth forest, and a mixture of agriculture, cattle farming and palm plantations. Temperatures at the study site ranged from 17°C to 23°C (Lopez Gutierrez et al. 2019). Total annual rainfall averaged 3,584 mm/yr in a seasonal pattern, where the rainy season occurred from June to November and dry season from December to May (Sanchez-Azofeifa et al. 2002).

Nest description. FVR first found the nest on 04 February 2025, when a pair of Shining Honeycreepers were already in the process of nest building. On subsequent days, observations were conducted by FVR, SB, WJ, AL, LG, ES, and OS with supervision by FVR. We obtained a total of 14 h and 27 mins of observations, over 26 days, from 04 February 2025 until 05 March 2025, when no activity was recorded around the nest, nor movement registered within the nest. We conducted observations from a 30-m canopy tower that provided a view approximately 8 m below the nest. We carried out most observations between sunrise and noon ($n = 202$ observations), however observations in the 3 hours before sunset were also recorded ($n = 18$ observations). We used standard 8x42 binoculars and a spotting scope (20-60x80 angled) for observations, and did not apply external stimuli, such as playbacks, during the observation period.

We described the nest within one of the four basic nest categories and their variants proposed by Simon and Pacheco (2005), and followed guidelines outlined by Fierro-Calderón et al. (2021) for collecting data on the breeding biology of Neotropical birds. While observing the nest, we recorded date, time of initiation and conclusion of activity at the nest by a honeycreeper, number of individuals, sex, age, and behavior (Supplementary Material Table S1). We used the package *ggplot2* (Wickham 2016) for the software R (R Core team 2025), to generate figures.

RESULTS

Nest description. The nest was located approximately 29 m above ground level in a *Coussapoa villosa* tree. Nest construction had already begun when the nest was detected on 04 February 2025 and continued for three days after the first sighting of the nest. Following Simon and Pacheco (2005), we categorized the nest as a low cup, with a fork support on a vertical twig (Figure 1A). The nest diameter was smaller than the adult female (estimated as <10 cm; Wetmore et al. 1984). In all images of the female Shining Honeycreeper sitting on the nest, both the bill and tail feathers were visible extending beyond the nest cup (Figure 1A). We were unable to collect the nest to determine the material used in construction due to the location of the nest at 29 m above ground. However, materials visible in the nest included thin dry fibers, white lichen and spiderweb, similar to the nest described by Skutch (1972).

Nesting behavior. We recorded a total of 220 events of activity at the nest, the vast majority (91%, $n = 202$) between dawn (5:30 h) and mid-day. Time at the nest by the parents presented a non-parametric distribution, where median duration



Figure 1. Structure and placement of a Shining Honeycreeper *Cyanerpes lucidus* nest in the canopy of a *Coussapoa villosa* tree, Osa Conservation Campus, Costa Rica. A) Nest in the fork of an upright twig, with female sitting in the nest, and male on a branch below the nest. Photo by Francisco Vega-Reyes, 05 February 2025. B) The female carrying a piece of fleshy fruit in her beak to the two nestlings. Photo by Camila Shanon, 03 March 2025. C) The nestling of approximately 9 days old looking out of the nest. Photo by Sarah E. Brown, 01 March 2025. D) Close-up of nestling and nest structure, showing white lichens on the outside of the nest cup. Photo by Daniel J. Lebbin, 01 March 2025; Macaulay Library at the Cornell Lab ML631766704, additional images available at <https://ebird.org/checklist/S216048971>.

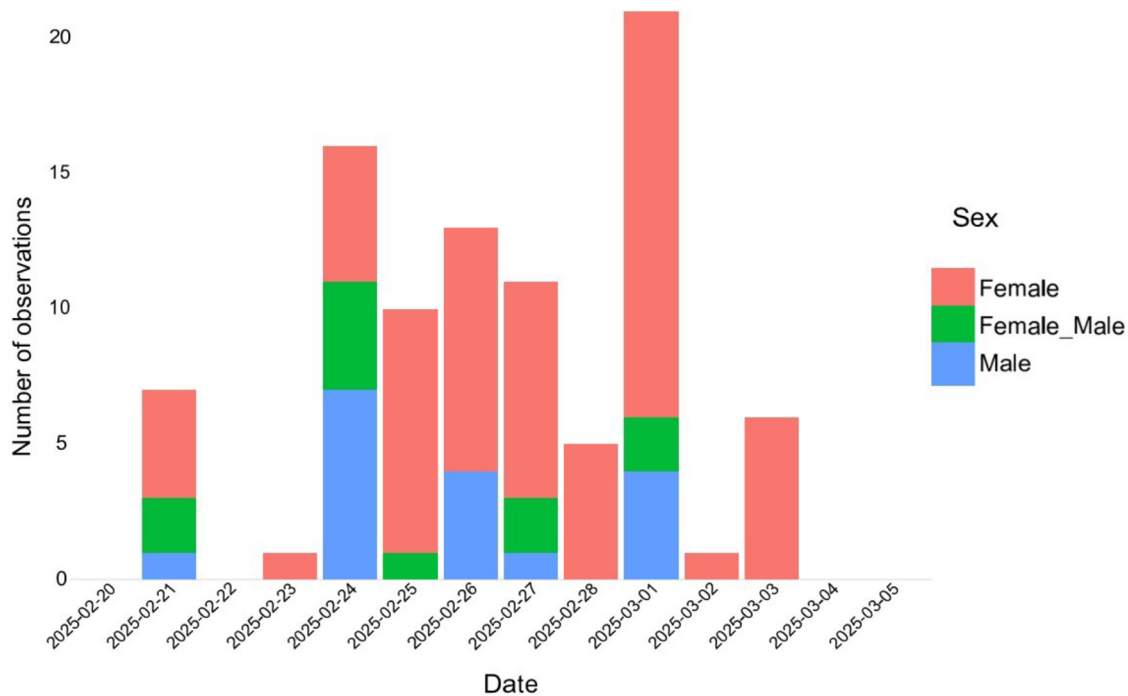


Figure 2. Number of food provisioning events recorded at a Shining Honeycreeper *Cyanerpes lucidus* nest by date, from 20 February 2025 to 03 March 2025. Pink = deliveries by female, Blue = deliveries by male, Green = deliveries by both adults together.

of nest attendance was 2 mins (quartile 1 = 30 s – quartile 3 = 540 s). Minimum time interacting with the nest was 30 s, while the longest recorded nest attendance was 7,920 s where the female sat in the nest for 2 h and 12 s. Throughout our observations, only two adult Shining Honeycreepers, a male and female, were detected at the nest, and we observed no evidence of helpers at the nest.

Incubation occurred over 13 days (07 to 19 February 2025), during which we registered 70 nest interactions, and only the female was observed sitting on the nest. Female nest attendance during the 13-day incubation period averaged 28.2 ± 23.8 mins, with a maximum time sitting on the nest of 2 h and 12 mins and a minimum nest attendance by the female of 2 mins. We also observed four interactions of the male honeycreeper with the nest or the female during the incubation period, in which the male arrived at the nest (Figure 1A), and after a couple of seconds departed with the female. Additionally, we were able to record a distraction display from the male Shining Honeycreeper towards a male and a female Green Honeycreeper *Chlorophanes spiza* exploring the surroundings of the nest. Due to the distance of the nest from the observation platform, we were unable to visually confirm the presence of eggs, however behavior of the nesting pair indicated incubation as the female sat on the nest for long periods of time, and neither of the parents were observed bringing food to the nest.

On 20 February 2025, we observed the adult honeycreepers bringing food to the nest (also seen in Figure 1B), and we assumed that chicks hatched the same day. On 21 February 2025, we first observed chicks directly (Figure 1C) and were able to monitor nestling activity from below due to the translucent structure of the nest (Figure 1D). Brood size was two altricial nestlings. The honeycreepers fed nestlings for 13 days from 20 February to 04 March 2025, after which no further activity was detected in or around the nest.

We registered a total of 91 feeding events at the nest, the majority of which were deliveries by the female (69.2%, $n = 63$ feeding events), whereas 18.6% were food deliveries by the male, and both male and female delivered food at the same time

in 12% of feeding events (Figure 2). Identification of the type of food delivered was only possible in 17 observations. Food provided by parents consisted of pieces of pulp from fruit (Figure 1B, $n = 14$ observations) and insects ($n = 3$ observations), including one *Orthoptera* species. Based on the plant species phenological calendar (Osa Conservation 2026), fruit pulp was suspected to come from *Brosimum lactescens* or *Sloanea zuliaensis*, both abundant species in the area (Lobo et al. 2008) that occurred close to the nest.

DISCUSSION

The 13-day incubation and 13 day nestling periods observed in our study were similar to the 12–13-day incubation and 13–14-day nestling periods reported for the Shining Honeycreeper by Skutch (1972), and those of the other *Cyanerpes* species where information is available (Pinto 1953; Sick 1993). However, very little information is available for species in this genus, with images of nests for only three *Cyanerpes* species available in public repositories, such as the Macaulay Library.

Overall, we observed the female Shining Honeycreeper had a more active role in nesting than the male, with no participation from the male in nest construction nor incubation of the eggs or recently hatched nestlings. This is a widespread behavior for all *Cyanerpes* species (Skutch 1954). Based on these trends, future bird banding surveys should not consider the presence/absence of incubation patches in males as indicators of breeding individuals (Jones 1971). Although the male did not participate in incubation, it was observed conducting distraction displays and chasing a Green Honeycreeper, a common conspecific in foraging flocks, that approached the nest. As with other species, such as the Red-legged Honeycreeper or the Blue Tit *Cyanistes caeruleus* (Bambini et al. 2019), reproductive effort of the male Shining Honeycreeper may comprise mainly activities of nest defense and resource provisioning, rather than incubation.

Our results contribute to knowledge on the life history of Neotropical bird species, where there is a high proportion of poorly-known species (Xiao et al. 2017). This data could be used

in further meta-analysis to evaluate life history theory for Neotropical birds (Fierro-Calderón et al. 2021). We encourage other researchers to publish their observations of breeding and other behaviors of poorly studied Neotropical birds in the forest canopy to fill continuing knowledge gaps, thereby improving ecological understanding and promoting appropriate species management.

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