



## SHORT NOTE

NOTES ON THE NEST, BREEDING SEASON, AND ELEVATIONAL RANGE OF A RARE HUMMINGBIRD, THE PURPLE-BACKED SUNBEAM (*AGLAEACTIS ALICIAE*)

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**Abstract** The breeding biology and phenology of the endangered hummingbird Purple-backed Sunbeam (*Aglaeactis aliciae*) are not well known. We report observations of nesting *A. aliciae* near El Molino, in La Libertad Department, Peru. On 11 March 2018, we found a female building a nest while on 10 March 2019 we found an incubating female. We describe specific characteristics of the nest and breeding behavior of nesting females. Based on our observations and that of others, the timing of nesting for this species seems to correspond to the mid-to-late rainy season, extending from at least March to May. Additionally, our sightings suggest a higher upper elevational range limit for this range-restricted Andean hummingbird than previously reported; the elevational range should be considered to be 2900–3700 m a.s.l.

**Resumen · Notas sobre el nido, temporada reproductiva y rango elevacional del Colibrí de Alicia (*Aglaeactis aliciae*)**

La biología reproductiva y la fenología del Colibrí de Alicia (*Aglaeactis aliciae*) – una especie de colibrí amenazada – son poco conocidas. Aquí reportamos observaciones de nidificación de *A. aliciae* en El Molino, Departamento La Libertad, Perú. El 11 de marzo de 2018 encontramos una hembra construyendo un nido, mientras que el 10 de marzo de 2019 encontramos a una hembra incubando. Describimos las características del nido y el comportamiento reproductivo de las hembras. En base a nuestras observaciones e información previa sugerimos que la temporada de nidificación se desarrolla desde mediados a fines de la temporada húmeda, extendiéndose desde marzo a mayo. Nuestras observaciones también indican que la especie se encuentra a mayores altitudes que lo reportado previamente y que su rango altitudinal sería 2900–3700 m s.n.m.

**Key words:** *Aglaeactis* · Altitudinal distribution · La Libertad · Nest · Peru · Purple-backed-Sunbeam · Trochilidae

## INTRODUCTION

The Purple-backed Sunbeam (*Aglaeactis aliciae*) is a hummingbird species endemic to northern Peru, where it occurs along drainages of the upper Marañón River valley. It has an estimated range size of only ~ 180 km<sup>2</sup> (Lambert & Angulo-Pratolongo 2007). Most observations of the species are from the area around the town of El Molino, in the department of La Libertad. Specimens were first taken in La Libertad by Baron (1895), and later Carriker (1932), near Succha and Soquián. A recent documented sight record from provincia Pallasca in northern Ancash (ca. 08°16'S latitude) suggests the species range might be slightly larger than currently thought (Cortez 2015). It is found in shrubby areas, especially with remaining patches of *Alnus* (Betulaceae) woodland, and it relies heavily on mistletoe (*Tristerix* sp., Loranthaceae) and uñico (*Oreocallis* sp., Proteaceae) flowers for foraging (Baron 1897, Bond 1954, Fjeldså & Krabbe 1990, Lambert & Angulo-Pratolongo 2007, Schulenberg et al. 2010). *Aglaeactis aliciae* is currently classified as endangered by the IUCN due to its small range, small estimated population size (~ 2000 individuals), and loss of critical habitat due to clearing for cattle pastures and replacement of native *Alnus* woodland in favor of eucalyptus and other non-native vegetation (BirdLife International 2019). The remaining *Alnus* woodland habitat surrounding El Molino is known to have declined in extent during the first decade of the 21st century (Lambert & Angulo-Pratolongo 2007).

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**Figure 1.** A) Nearly completed nest of a Purple-backed Sunbeam (*Aglaeactis aliciae*) found on 11 March 2018 in El Molino, La Libertad, Peru. B) Female *A. aliciae* sitting on nearly completed nest. C) Habitat where *A. aliciae* nest was found. Photos by MJB and ABJ.

Considering that *A. aliciae* has a small geographic range in mountainous terrain, the extent of suitable habitat and the population size are critically dependent on the elevational range. The species' elevational range has been reported variously as 3000–3200 m a.s.l. (Fjeldså & Krabbe 1990, Parker et al. 1996, Schuchmann 1999), 3000–3400 m a.s.l. (Schulenberg et al. 2010), and 2900–3500 m a.s.l. (Birdlife International 2019). However, the 25 sites of occurrence reported by Lambert & Angulo-Pratolongo (2007) ranged from 2908–3409 m a.s.l.

Little information exists about the breeding phenology of *A. aliciae*, as few observations of nesting activities have been published. Juvenile specimens have been reported in February, March, and June (Fjeldså & Krabbe 1990), and a female was reported to be sitting on a nest in May 2013 near El Molino (photo in Schuchmann et al. 2019). A male specimen was reported to have enlarged testes in June, suggesting that the breeding season may extend later in the year than previously suspected (Schuchmann 1999). Lambert & Angulo-Pratolongo (2007) conducted extensive surveys for the species in late June and July, and observed numerous individuals that were suspected to be juveniles, but they observed no nesting behavior or fledglings.

The nest of *A. aliciae* has not been described formally, although there is one published photo (Schuchmann et al. 2019). Here we describe active nests of *A. aliciae* from March 2018 and March 2019, respectively, and we discuss their context and implications for the breeding biology and elevational range of the species.

## OBSERVATIONS

On the morning of 11 March 2018, MJB, ABJ, and EB were bird-watching above El Molino, La Libertad, when they encountered three *A. aliciae* foraging on and defending patches of *Tristerix* and *Siphocampylus* sp. (Campanulaceae) flowers. The yellowish *Siphocampylus* flowers had previously been described as an important food source for this species (Lambert & Angulo-Pratolongo 2007). Two *A. aliciae* left the area, but the third, a presumed female (no male hummingbirds are known to help in nest-building or rearing offspring; Schuchmann 1999), flew into the rank vegetation overgrowing the cut bank on the uphill side of the road (Figure 1). She emerged after 30 seconds carrying something small and whitish in her bill. When she perched among vines, we realized that she was building a nest and that she had been carrying a piece of lichen. The nest was near completion and suspended over the edge of the road, ~ 3.5 m above the road surface and set back ~ 0.3 m into the vegetation (7°45.43'S, 77°46.02'W, 3591 m a.s.l.; Figure 2). Over the next hour, we observed and photographed the nest and the nest building process. We were careful to avoid disturbing the bird, so we made our observations from a distance of ~ 10 m, approaching more closely only one time to obtain the photographs included in Figure 1. Overhanging branches and foliage concealed the nest well. The nest was cup-shaped and constructed of mosses, lichens, and dried foliage that appeared to be attached to branches by spider webs (Figure 1). The attending adult female made three visits to the nest





**Figure 2.** Locations of Purple-backed Sunbeam (*Aglaeactis aliciae*) nests in El Molino, La Libertad, Peru on 11 March, 2018 (red star; 7°45.43'S, 77°46.02'W, 3591 m a.s.l.) and 10 March, 2019 (yellow star; 7°45'14.1876''S, 77°46'55.938''W, 3597 m a.s.l.).

during our period of observation and on two of those visits she added lichens to the nest cup. She repeatedly adjusted the shape of the nest with her body for several minutes while she sat in the nest during the visits. After each visit to the nest, she left to fend off other *A. aliciae* in the area, sometimes engaging in extended territorial fights.

On 10 March, 2019, almost exactly one year after the first observation, CSC, CAC, ATP, and DJL observed and photographed a nest with an *A. aliciae* sitting on it during a hike along a wide stone trail used by sheep and goat herders above El Molino. CSC spotted the nest when a bird flew and landed on it (Figure 3). The nest appeared to be complete and was suspended in the open from twigs growing out of a cliff face, ~ 10 m above a stream (7°45'14.1876''S, 77°46'55.938''W, 3597 m a.s.l.; Figure 2). We observed the nest from a distance of > 15 m and the bird appeared undisturbed by our presence. The nest was cup-shaped and mostly white, covered with lichen (Parmeliaceae) and spiderwebs, made of similar materials to the 2018 nest, and had a short tail of white hanging debris (Figure 3; additional photos available at eBird.org, checklist S53684298, and in the collection of images of the Department of Ornithology, Natural History Museum of the University of San Marcos, Lima, Peru). The bird was sitting on the nest for approximately ten minutes, and we suspect it may have been incubating eggs, but we could not observe the contents of the nest from our vantage point.

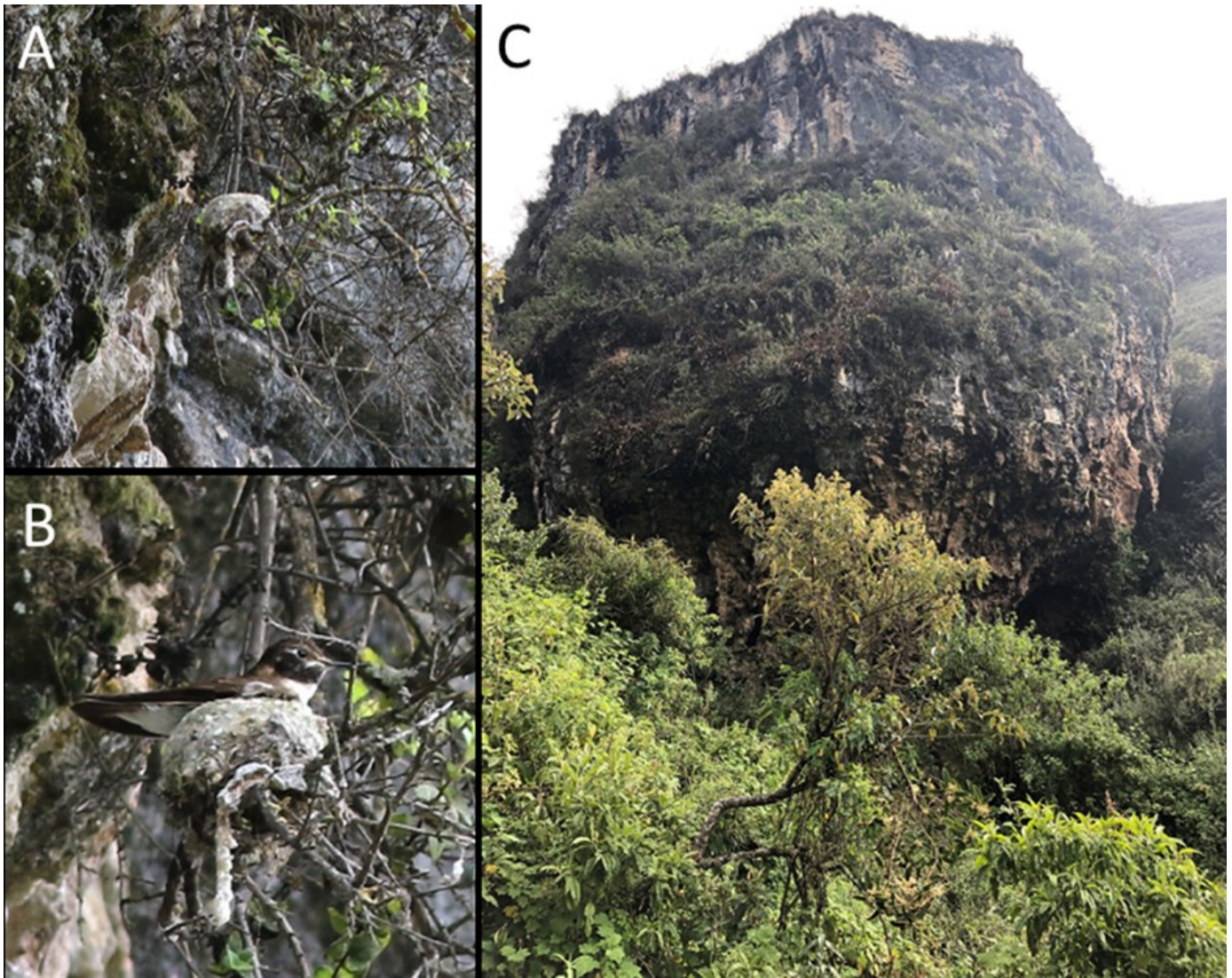
In order to estimate the external dimensions of both nests, we took several morphological measurements of *A. aliciae* specimens ( $n = 2$ ) and used them to calibrate size in photos of *A. aliciae* on their nests. We measured average crown width (12.7 mm, SD = 0.3), exposed culmen (16.7 mm, SD = 0.4), total bill length to gape (20.1 mm, SD = 0.05), and wing length (68.4 mm, SD = 1.6) for calibrations. Using this method, we estimated the outside dimensions of the nests

to be 57.2 mm and 71.7 mm, respectively, in diameter (mean = 64.5mm, SD = 10.2), and 39.8 mm and 50.5 mm, respectively, in depth (mean = 45.1, SD = 7.5). In comparison, a Shining Sunbeam (*Aglaeactis cupripennis*) nest housed at the Western Foundation of Vertebrate Zoology (EN-168877) measured 68.3 mm in width by 40.6 mm in external depth (R. Corado *in litt.*). Additionally, a similar-sized hummingbird in the brilliant clade, the Bronzy Inca (*Coeligena coeligena*), is reported to have a nest external diameter of 62 mm (Dyrce & Greeney 2008), comparable to our diameter estimates for *A. aliciae*.

## DISCUSSION

Our observations of two nests occurring close to 3600 m a.s.l., along with several observations of *A. aliciae* flying and foraging in suitable habitat at elevations up to 100 m higher than the nests, suggest that the upper elevational range limit of the species is best estimated at 3700 m. This upward extension implies that previous publications had underestimated the extent of its elevational range by a magnitude of 133–400%. The species' upper elevational range limit has been previously reported as 3200 m, 3400 m, or 3500 m a.s.l. The species' lower elevational range limit, previously reported as 2900 m or 3000 m a.s.l., is best estimated at 2900 m based on the four sites of occurrence between 2900–3000 m reported by Lambert & Angulo-Pratolongo (2007). The most likely explanation for the elevational discrepancy between previous reports and our observations is that the higher elevation areas within the species range had not been surveyed previously. However, it is difficult to rule out the possibility that there may have been upward shifts during recent years, perhaps driven by climate change (Freeman et al. 2018). EB observed that this species was abundant at and above 3550





**Figure 3.** A) Completed nest of Purple-backed Sunbeam (*Aglaeactis aliciae*) found on 10 March 2019 in El Molino, La Libertad, Peru. B) Female *A. aliciae* sitting on nest and suspected to be incubating eggs. C) Cliff face where the *A. aliciae* nest found was suspended from. Photos by DJL and CSC.

m a.s.l. in the El Molino area during October 2012, suggesting that occurrence of the species above 3500 m is not a new phenomenon. Seasonal shifts in elevation provide a plausible explanation for the discrepancies among previous elevational range estimates; however, more data are needed to evaluate this possibility.

Few observations of nests or breeding ecology have been documented previously for *A. aliciae*. This is not surprising considering its extremely small geographic range and correspondingly small population size. We observed one nearly complete nest in the final stages of construction and one complete and active nest. Both nests were observed in early March. A previously photographed nest was active in May, in the same area (Schuchmann et al. 2019). These observations suggest that the breeding season of *A. aliciae* starts during the wettest period of the year, which occurs during February and March (Lavado et al. 2012) and continues approximately until May in this region of Peru. Lambert & Angulo-Pratolongo (2007) did not find nests or fledglings but found numerous apparent juveniles during their extensive range-wide survey in June and July 2006, suggesting that the breeding season was already complete. Of the 26 eBird checklists from the El Molino area prior to 9 March 2019 that included

*A. aliciae*, only two occurred during the period of March–May, suggesting that observer preference for drier months may have contributed to the lack of observations of breeding habits of this species (eBird.org checklists accessed 8 March 2019). Surveys for breeding activity between March and May are warranted to gain additional information about reproduction in this range-restricted Andean hummingbird species. Consistent with numerous other papers of the last decade (e.g., Witt & Lane 2009, Benham et al. 2011, Schmitt et al. 2013, Sornoza-Molina et al. 2018), our findings emphasize that there is still a tremendous amount to learn and discover about biological, ethological, and ecological aspects of the high Andean avifauna, including a number of currently understudied members of the family Trochilidae.

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