

ARTÍCULO/ARTICLE

The nest and eggs of Black-capped Sparrow *Arremon abeillei abeillei* (Passerellidae) in southwestern Ecuador

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Nido y huevos del Saltón Gorrinegro *Arremon abeillei abeillei* (Passerellidae) en el suroeste de Ecuador**Resumen**

Describo el nido y el huevo del Saltón Gorrinegro *Arremon abeillei abeillei*, proporcionando la primera información documentada sobre su biología reproductiva y el primer reporte de parasitismo por el Vaquero Brillante *Molothrus bonariensis*. Estudié siete nidos en dos lugares en el suroeste de Ecuador. Los nidos son estructuras cerradas, en forma de horno, con una entrada lateral, ocultas entre la hojarasca, tanto en terreno plano como en terreno inclinado. El tamaño de la puesta confirmada en un nido fue de cuatro huevos; 13 huevos observados variaron desde cremoso pálido hasta blanco puro, marcados escasamente con manchas de color marrón oscuro o negro, manchas pequeñas y garabatos cortos. La arquitectura del nido es similar a la de los congéneres tradicionalmente clasificados en los géneros *Arremon* y *Lysurus*, incluso a los miembros del género *Arremonops*, pero no es congruente con los nidos de copa abierta de taxones relacionados históricamente ubicados en los géneros *Buarremon* o *Atlapetes*. La coloración del huevo sugiere similares relaciones entre estos géneros.

Palabras clave: arquitectura del nido, *Arremon abeillei*, biología reproductiva, Saltón Gorrinegro, historia natural, huevo, Passerellidae.

Abstract

I describe the nest and egg of Black-capped Sparrow *Arremon abeillei abeillei*, providing the first substantiated information on its breeding biology and the first report of brood parasitism by Shiny Cowbird *Molothrus bonariensis*. I studied seven nests at two locations in southwestern Ecuador. Nests are enclosed, oven-shaped structures with a side entrance, concealed amongst leaf litter on either flat or sloping ground. Confirmed clutch size at one nest was four eggs; 13 eggs observed varied from very pale buff to pure white, sparsely marked with dark brown or black flecks, small spots, and short scrawls. Nest architecture is similar to that of congeners traditionally placed in the genera *Arremon* and *Lysurus*, and to members of the genus *Arremonops*, but differs from the open-cup nests of related taxa historically placed in the genera *Buarremon* or *Atlapetes*. Egg coloration reflects similar relationships within these genera.

Keywords: *Arremon abeillei*, Black-capped Sparrow, breeding biology, egg, natural history, nest architecture, Passerellidae.

INTRODUCTION

There are 48 taxa currently included within the genus *Arremon*, a morphologically uniform group of robust, generally ground-foraging New World sparrows (Passerellidae) found across most of Central and South America (del Hoyo *et al.*, 2018; Remsen *et al.*, 2018). The breeding biology of *Arremon* is poorly documented, with fewer than half of these taxa having published nest descriptions. There is a single published description of the nest and eggs of Black-capped Sparrow *Arremon abeillei* (Armani, 1985). Armani (1985) describes the nest as furnace-shaped, composed externally of leaves and rootlets and lined with fine fibers, placed on the ground amongst the roots of trees or shrubs. He gives clutch size as two eggs, describing them as white, marked with brown and blackish. The basis for this description is not specified; no sample size, date, or location are given. Despite the fact that this description appears to be more or less accurate, other descriptions in Armani (1985) have proven to be unreliable and unsubstantiated by direct observations or verifiable data (K. Zyskowski, in litt.

2018). It is highly desirable, therefore, to have a well-documented, quantified description of the nest and eggs of this poorly-studied species. Traditionally, *A. abeillei* is treated as including two subspecies: *A. abeillei abeillei* and *A. a. nigriceps* (Dickinson & Christidis, 2014). The latter is confined to the Upper Marañón Valley of extreme southern Ecuador (southern Zamora-Chinchipec) and northwest Peru (eastern Cajamarca), and is considered by some to merit full species status (Marañón Sparrow *A. nigriceps*; del Hoyo & Collar, 2016). Nominate *abeillei*, similarly range-restricted and also lacking information on its breeding biology, is found from southwestern Ecuador (south from Manabí) to western Peru (south to western Cajamarca). Herein, I provide descriptions of the nest and egg of nominate *abeillei*, based on seven nests studied in southwest Ecuador.

METHODS

I studied the nesting of Black-capped Sparrow at two locations in southwestern Ecuador. In February 2006, I made several short visits to Bosque Protector Cerro Blanco (-2.150168, -80.042765; 300 m a.s.l.), a private reserve located 15 km west of Guayaquil, Guayas province (see Mischler & Sheets, 2007; Mischler, 2012). In February and March 2006, 2010, and 2014 I made periodic visits to the Reserva Privada Jorupe (-4.381419, -79.895106; 600 m a.s.l.), near Macará, Loja province (see Miller *et al.*, 2012). Habitat at both reserves is mostly lightly to moderately disturbed tropical deciduous forest, typical of the Tumbesian bioregion (Best & Clarke, 1991; Best & Kessler, 1995). The fairly open forest canopy is 15–25 m above a dense, tangled, rather spiny understory and is dominated by widely-spaced, canopy-emergent *Ceiba trichistandra* (Bombacaceae) trees. I discovered and studied nests opportunistically, during the course of other field work.

RESULTS

Nest architecture and placement

I studied seven nests, six of which were completed and one which I was not able to follow through to clutch initiation. A summary of the dates and locations of all breeding records is presented in Table 1. The nests of Black-capped Sparrow are built on the ground. They are enclosed, fairly messy, oven-shaped, balls of small sticks, dead leaves, rootlets, and plant fibers, entered through an opening in the side (Fig. 1). Materials are generally coarser on the outside, finer on the inside, and the inner portion of the egg cup is lined almost exclusively with fine, flexible fibers (mostly dark colored) that include dark rootlets, long strands of mammalian hair (horse or cow), fungal rhizomorphs (*Marasmius* sp.), and thin, pale grass stems. Measurements (cm) for six nests are presented in Table 2. Although it was not always easy to see, it appears that all nests also included a “runway” of arranged material extending along the ground in front of the nest, as has been described for other species with similar nests, particularly those of several genera of New World warblers (Parulidae; see Curson, 2010). The materials included in these runways differed little from those used in the outer portions of the nest and from the surrounding leaf litter. These runways were generally slightly narrower than the outer width of the nest, and their obviousness, length, and thickness seemed to vary with the steepness of the slope on which the nest was built; with those on steeper slopes tending to have looser, less obvious runways. Runway length (cm) of the six nests was: 7.5, 7, c.11, 10, 6, and 10. Three of the seven nests I examined were built on nearly level ground, two were on moderately inclined ground (slope c. 30–45°), and two were on small, nearly vertical, banks.

Eggs

The eggs of Black-capped Sparrow ($n = 13$) are very pale buff to pure white with sparse, dark brown to black flecks, small spots, and short scrawls (Fig. 2). A complete clutch of four very fresh eggs at Cerro Blanco on 25 February 2006 had the following measurements: 22.7 × 17.1 mm, 3.59 g; 23.6 × 16.9 mm, 3.69 g; 23.2 × 16.9 mm, 3.66 g; 23.7 × 16.5 mm, 3.46 g). Three undeveloped eggs of a possibly incomplete clutch at Jorupe on 15 February 2010 measured: 22.87 × 18.01 mm, 3.99 g; 23.70 × 16.98 mm, 3.79g; 23.30 × 17.10 mm, 3.77 g. Three fresh eggs of a possible incomplete clutch at Jorupe on 2 March 2014 measured: 22 × 17 mm, 3.5 g; 24 × 17 mm, 3.6 g; 23 × 17 mm, 3.5 g. Also at Jorupe, a nest found 1 March 2010 contained three sparrow eggs and one egg of the Shiny Cowbird *Molothrus bonariensis*.



Figure 1: A nest of Black-capped Sparrow *Arremon abeillei abeillei* with an incomplete clutch of two eggs, 14 February 2010, Jorupe, Ecuador (photo H. F. Greeney).

Table 1. Breeding activity of Black-capped Sparrow *Arremon abeillei abeillei* in southwestern Ecuador. Stage: B = building; I = incubation; N = nestling; CF = carrying food, nestlings or fledglings; F = fledgling.

Date	Location	Stage	Observations
25 February 2006	Cerro Blanco	I	Four fresh eggs, nest is 40 cm from bottom of 1.5 m tall bank on edge of small drainage.
28 February 2006	Cerro Blanco	N	Four nestlings, nest situated 1.5 m from bottom of 2.5 m-tall bank on edge of small drainage with no water, 25 m from actual stream.
8 April 2006	Jorupe	F	At least one fledgling traveling with adults, but no feeding seen.
12 April 2006	Jorupe	F	Pair of adults feeding at least one fledgling.
12 April 2006	Jorupe	F	Second pair of adults feeding at least one fledgling.
18 April 2006	Jorupe	F	Young fledgling, perched in low vegetation.
23 April 2006	Jorupe	CF	Pair of adults carrying food repeatedly to same area.
14 February 2010	Jorupe	L	Two fresh eggs, third egg laid 15 February, nest partially destroyed and abandoned on 16 February.
17 February 2010	Jorupe	N	Three mid-aged nestlings.
1 March 2010	Jorupe	I	Four fresh eggs, three of Black-capped Sparrow, one of Shiny Cowbird, eggs disappeared on or before 3 March.
1 March 2014	Jorupe	B	Just beginning construction.
29 March 2014	Jorupe	B	Three eggs laid by 2 March.

Nestlings

A nest at Cerro Blanco contained four young nestlings (Fig. 3) on 28 February 2006. The young nestlings, with eyes still closed, had dusky pink skin. Their legs and bills were slightly dusker than skin and contrasted with their bright yellow-white rictal flanges and deep red mouth linings. They had a moderately dense covering of dark gray natal down. No contour or flight feather pins had broken through the skin. At Jorupe, on 17 February 2010, a nest contained three mid-aged nestlings (Fig. 4), whose primary pin feathers I estimate to have broken

their sheaths within the past 48 h. The nestlings had tarsal lengths (mm) of 23.8, 24.7, and 24.4, respectively weighing 17.2 g, 18.2 g, and 18.5 g. The adults appeared greatly agitated by my visit to the nest, making sharp *chip* calls and generally staying 3–5 m away and hidden behind thick vegetation. Only when one of the nestlings vocalized while I handled it, did the adults approach, still chipping, to within 1.5–2 m, one of them performing what appeared to be a brief broken-wing display.

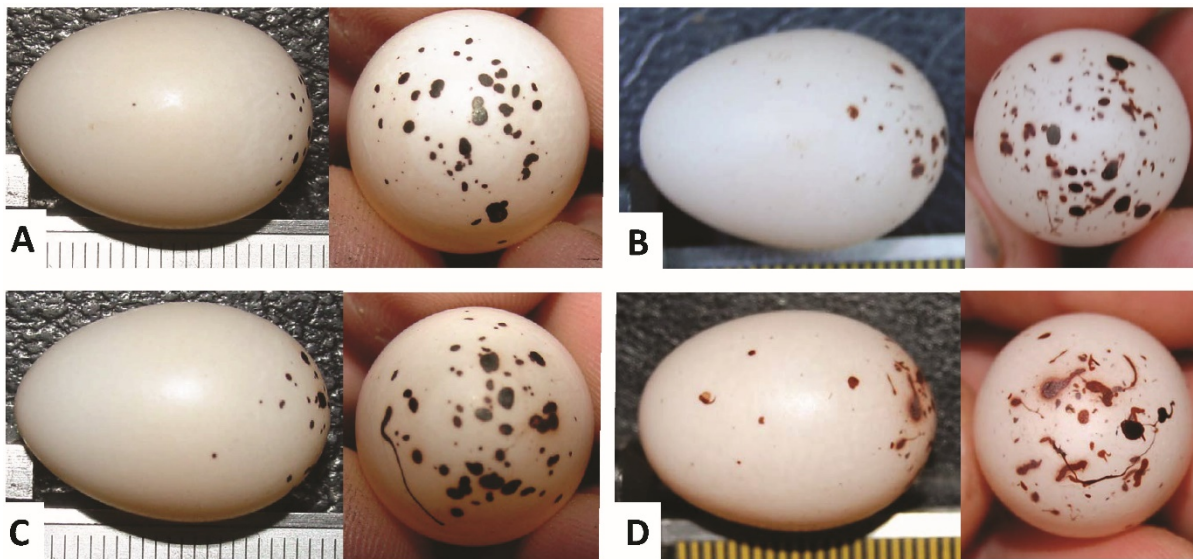


Figure 2: Eggs of Black-capped Sparrow *Arremon abeillei abeillei*, in southwest Ecuador. A) 25 February 2006, Cerro Blanco; B) 14 February 2010, Jorupe; C) 25 February 2006, Cerro Blanco, same clutch as A; D) 15 February 2010, Jorupe, same clutch as B (photos H. F. Greeney).



Figure 3: Young nestling of Black-capped Sparrow *Arremon abeillei abeillei*, 28 February 2006, Cerro Blanco, Ecuador (photo H. F. Greeney).

Table 2. Linear measurements for six nests of Black-capped Sparrow *Arremon abeillei abeillei* in southwestern Ecuador. Seven measurements are given (cm): **A**) external height; **B**) external width; **C**) external depth (front to back); **D**) opening (entrance) height; **E**) opening width; **F**) internal diameter (egg cup and chamber); **G**) total internal height of nest chamber; **H**) internal depth (of egg cup).

	A	B	C	D	E	F	G	H
Nest 1	18	13	13	5.5	6.5	7	8.5	5
Nest 2	15	12	12	5	6	7	9	4.5
Nest 3	16	14	13	4	6.5	7	8.5	5.5
Nest 4	16	12	12	5	6.5	8	8.5	5.5
Nest 5	14	14	15	6	7	8	10	4.5
Nest 6	15	16	14	5	6	7.5	8	5
Mean	15.7	13.5	13.2	5.1	6.4	7.4	8.8	5.0
STDEV	1.4	1.5	1.2	0.7	0.4	0.5	0.7	0.4

DISCUSSION

This is apparently the first record of brood parasitism for Black-capped Sparrow, and represents a new host record for Shiny Cowbird (Friedmann & Kiff, 1985; Fraga, 2018). Previous host records include other species of *Arremon*, as well as both *Arremonops* and *Atlapetes* species (Friedmann *et al.*, 1977, 1985). Cowbird parasitism presents a serious threat to at least one relative of Black-capped Sparrow, the Pale-headed Brush-finch *Atlapetes pallidiceps* (Opell *et al.*, 2004), also a Tumbesian endemic (Birdlife International 2017). The frequency of brood parasitism in Black-capped Sparrow remains unknown, but its potential as a host and the possible conservation repercussions deserve closer inspection.

Table 3. Nest description of Black-capped Sparrow *Arremon abeillei abeillei* described in the literature.

English name	Latin name	Source
Sooty-faced Finch	<i>Arremon crassirostris</i>	Barrantes, 1994; Young & Zook, 1999
Olive Finch	<i>Arremon castaneiceps</i>	Schulenberg & Gill, 1987; Rasmussen <i>et al.</i> , 1996; Greeney & Gelis, 2006; Flórez-V. & Londoño, 2012
Chestnut-capped Brush-finch	<i>Arremon brunneinucha suttoni</i>	Rowley, 1966, 1984
	<i>Arremon b. macrourus</i>	Baepler, 1962; Skutch, 1967
	<i>Arremon b. apertus</i>	Edwards & Tashain, 1959
	<i>Arremon b. elsae</i>	Carriker, 1910; Skutch, 1967
	<i>Arremon b. frontalis</i>	Taczanowski, 1884
Green-striped Brush-finch	<i>Arremon virenticeps</i>	Rowley, 1962
Costa Rican Brush-finch	<i>Arremon costaricensis</i>	Skutch, 1954
White-browed Brush-finch	<i>Arremon torquatus borellii</i>	Auer <i>et al.</i> , 2007
Saffron-billed Sparrow	<i>Arremon flavirostris dorbignii</i>	di Giacomo & López-Lanús, 1998; de la Peña, 2005
	<i>Arremon f. polionotus</i>	Hartert & Venturi, 1909; Dinelli, 1918; di Giacomo, 2005
Pectoral Sparrow	<i>Arremon taciturnus taciturnus</i>	Haverschmidt, 1962
	<i>Arremon t. nigrirostris</i>	Valdez-Juárez & Londoño, 2011
Half-collared Sparrow	<i>Arremon semitorquatus</i>	Euler, 1900
Orange-billed Sparrow	<i>Arremon aurantirostris rufidorsalis</i>	Richmond, 1893
	<i>A. a. aurantirostris</i>	Skutch, 1954
	<i>A. a. saturata</i>	del Toro, 1952
Golden-winged Sparrow	<i>Arremon schlegeli schlegeli</i>	Tye & Tye, 1992

Following the taxonomic arrangement of del Hoyo *et al.* (2018), there are now adequate nest and egg descriptions available for 20 taxa of *Arremon* sparrows (Table 3). These descriptions provide a clear division into two groups within *Arremon*, as it is currently defined (del Hoyo *et al.*, 2018; Remsen *et al.*, 2018). The first group (hereafter Nest Group 1) includes taxa which lay unmarked white or pale bluish eggs and build broad, open-cup nests: *A. brunneinucha suttoni*, *A. b. macrourus*, *A. b. apertus*, *A. b. elsae*, *A. b. frontalis*, *A. virenticeps*, *A. costaricensis*, and *A. torquatus borellii*. The second group (hereafter Nest Group 2) lays white or pale buffy eggs with sparse dark spotting and build enclosed, oven-shaped nests with a lateral entrance: *A. flavirostris dorbignii*, *A. f. polionotus*, *A. taciturnus taciturnus*, *A. t. nigrirostris*, *A. semitorquatus*, *A. aurantirostris rufidorsalis*, *A. a. aurantirostris*, *A. a. saturata* and *A. s. schlegeli*). The two similar taxa historically included in the genus *Lysurus* (*A. crassirostris* and *A. castaneiceps*; see Ridgely & Tudor, 2009) do not fit neatly into either of these nest groups (see below).

The taxonomic history of species in Nest Group 1 is complex and, at times, all taxa have been lumped into two (Wetmore *et al.*, 1984; Fjeldså & Krabbe, 1990) or three (Ridgely & Tudor, 1989, 2009) species. Prior to recent phylogenetic analyses (Cadena *et al.*, 2007; Klicka *et al.*, 2014), members of Nest Group 1 have been placed either in *Buarremon* or *Atlapetes* (Hellmayr, 1938; Paynter, 1970; Ridgely & Greenfield, 2001; Dickinson 2003); see Remsen & Graves (1995a, 1995b) and Cadena & Cuervo (2010) for further details. So far as is known, members of the genus *Atlapetes* build open-cup nests and lay white eggs with cinnamon or vinaceous spotting (Rowley, 1962, 1966; Salaman *et al.*, 1998; Oppel *et al.*, 2003; de la Peña, 2005; Biancucci & Martin, 2008; Greeney, 2009; Peraza, 2009; Olaciregui & Botero-Delgado, 2012; Forrester & Londoño, 2016). Sparrows in the closely related genus *Arremonops* (del Hoyo *et al.*, 2018), sometimes merged into *Arremon* (Phelps & Phelps, 1950; Meyer de Schauensee, 1951) lay unmarked eggs like Nest Group 1, but clearly have nest architecture that is nearly indistinguishable from members of Nest Group 2 (Merrill, 1878; Sennett, 1878; Stone, 1918; Skutch, 1954; Rowley, 1984; Salgado-Ortiz *et al.*, 2001). As mentioned above, *A. crassirostris* and *A. castaneiceps*, previously separated in the genus *Lysurus* fall most readily within Nest Group 2, particularly with respect to nest architecture. The eggs of both species, however, are in fact most similar to eggs of the genus *Atlapetes*, being marked with cinnamon or vinaceous spotting rather than the darker and sparser markings of Nest Group 2. It is interesting to note that eggs of *A. castaneiceps* described from numerous clutches from several portions of its range, vary in coloration, both within and between populations, from well-marked with cinnamon spotting to completely unmarked (Sclater & Salvin, 1879; Schulenberg & Gill, 1987; Rasmussen *et al.*, 1996; Greeney & Gelis, 2006; Flórez-V. & Londoño, 2012). In conclusion, it is clear that further natural history data and additional molecular analyses are needed to completely understand the complex relationships within the currently-defined group of sparrows in the genera *Atlapetes*, *Arremonops* and *Arremon*.

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Figure 4: Mid-aged nestling of Black-capped Sparrow *Arremon abeillei abeillei*, 17 February 2010, Jorupe, Ecuador (photo H. F. Greeney).