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Cover: A Magellanic Penguin (*Spheniscus magellanicus*) with discolored and worn-out plumage in southeastern Brazil. In this issue, Vanstreels *et al.* reported several similar cases in penguins found in its northernmost wintering grounds, speculating on the causes of this aberrant plumage. Photo author: Renata Hurtado.

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SHORT-COMMUNICATION

A Narrow-billed Woodcreeper, *Lepidocolaptes angustirostris*, nesting in a mailbox

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ABSTRACT: Documenting the adaptations of birds to live in urban areas is important in a context of an anthropogenically altered world where such areas may represent novel ecological opportunities for birds. Here I report on a nest of the Narrow-billed Woodcreeper *Lepidocolaptes angustirostris* in a wooden mailbox in a suburban area. The nest was found in the first week of November 2016 with three eggs, and later two nestlings that died within approximately one week likely due to water leaking into the box. The ability of L. angustirostris to use man-made structures for foraging and nesting, and its typical occurrence in open areas (thus differing from the family pattern of predominantly forest species) are factors permitting the occupation of urban habitats.

KEY-WORDS: breeding biology, Dendrocolaptidae, nest box, suburban, urban adapter.

The utilization of man-made structures for foraging and nesting may represent novel adaptations that permit the occupation of urban environments by birds. Documenting such adaptations is important in a context of an anthropogenically altered world where the area occupied by cities is increasing, which represents threats to many bird species (Loss *et al.* 2014, Woinarski *et al.* 2017) but ecological opportunities for others (Hill-III & Scherer-Neto 1991, Petri *et al.* 2013). Here, I report on a nest made by the Narrow-billed Woodcreeper *Lepidocolaptes angustirostris* in a mailbox in a suburban area (*sensu* Marzluff *et al.* 2001) in southeast Brazil.

Lepidocolaptes angustirostris inhabits a variety of habitats, from open woodlands to deciduous forests, plantations and the periphery of cities (Marantz *et al.* 2003). It nests in natural and woodpecker cavities, but also in crevices present in man-made structures such as cement column, bridges, and electric poles (de la Peña 2010). Nesting occurs from October to January in Argentina, Uruguay, Paraguay, south and southeast Brazil (Marantz *et al.* 2003). Nests in natural cavities in Argentina had an average clutch size of 3.0 eggs (range 2–4 eggs, $n = 4$) and were situated 2.2 m above the ground (1.4–3.2 m, $n = 8$; de la Peña 2010), while in the *Cerrado* of central Brazil nests had 1.7 eggs (1–3, $n = 7$) and were 2.0 m high ($n = 8$; Marini *et al.* 2012).

The nest was found in the first week of November 2016 in a wooden mailbox (30 × 30 × 18 cm) located below a *Licania tomentosa* tree (Chrysobalanaceae) in the outskirts of Rio Claro (22°21'50.86''S; 47°31'27.08''W), southeast Brazil. The mailbox was supported by a 1.2 m wood pole, and had a rectangular entrance (4 × 17 cm) positioned in the upper third portion of the box and protected by an overhanging shelter (Fig. 1A). The nest was lined by a bed of bark flakes, apparently from an *Eucalyptus* species (several *Eucalyptus* trees were in a forest fragment 50 m from the nest), and contained three eggs when discovered. Unintentional disturbance by the mailbox owner caused the breakage of one egg, but two nestling were present one week later (Fig. 1B). According to the owner, a severe storm provoked water leaking into the mailbox causing the death of nestlings when they were approximately one-week old.

Nest boxes are used as nesting sites by a variety of birds, but as far as I know this is the first report of a woodcreeper using such a structure for nesting. The fact that *L. angustirostris* naturally nests at low heights likely contributed to the adoption of the mailbox as a nest site. The behavioral and ecological flexibility of the species is another factor to consider. For instance, *L. angustirostris* forage in walls and cement columns (Batisteli *et al.* 2017, pers. obs.), and can breed in abandoned *Eucalyptus* plantations (Pereira *et al.* 2015). These traits, together with the fact that it typically occurs in open areas (Marantz *et al.* 2003), most probably permit the status of "urban adapter" for this woodcreeper species and help to explain its geographic expansion into deforested areas of Atlantic Forest (Maldonado-Coelho *et al.* 2017).

As secondary-cavity nesters, woodcreepers are likely subjected to shortage of nest sites (Cockle *et al.* 2010),

Figure 1. (**A**) Front view of the mailbox where *Lepidocolaptes angustirostris* made its nest. Note the rectangular entrance protected by a shelter. (**B**) The interior of the box showing two nestlings to the right and lining of bark flakes.

which lead Sick (1997) to suggest that the provision of nest boxes might help to maintain populations of woodcreepers in forests where appropriate cavities for nesting is in short supply. This suggestion was apparently supported by his observation that certain woodcreepers (*L. angustirostris* and *Lepidocolaptes squamatus*) occasionally nest in buildings (Sick 1997, see also Jesus & Mikich 2013), indicating that they might accept man-made structures for nesting. Besides adding another man-made structure to the list of potential nest sites for *L. angustirostris*, the observation reported here indicates that this and possibly other woodcreeper species may indeed use nest boxes as Sick (1997) envisaged.

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SHORT-COMMUNICATION

Some Venezuelan wild bird species that box against their own reflections

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ABSTRACT: Data about shadow boxing behavior in Neotropical wild birds is almost absent. A total of 16 novel wild bird species were found performing shadow boxing behavior in northern Venezuela. Families Trochilidae, Picidae, Tyrannidae, Corvidae, Turdidae, Mimidae, Thraupidae, Emberizidae, and Parulidae were represented, with Trochilidae and Tyrannidae reported for the first time. Reflecting surfaces were car components, home windows, glass sliding doors, and a stainless steel pot. As expected, date of records and breeding season information matched for all species. Nonetheless, the White-vented Plumeleteer *Chalybura buffonii* behavior does not appear to be related to its breeding condition. Instead, this species shadow box to defend a food source. While most birds shadow box with their beak, wings and feet, Trochilidae species developed aerial displays, and beat their reflections with the breast and beak. Two records involved female individuals. Recorded information noticeably improves the previous knowledge of avian shadow boxing behavior in Venezuela and the Neotropical region.

KEY-WORDS: agonistic behavior, avian behavior, bird aggressions, mirror reflections, shadow boxing.

Avian "shadow boxing" has been described as a behavior where birds attack, fight, call, peck, display or fly against their own reflections on shiny surfaces, such as mirrors and windows, as well as chrome bumpers or polished surfaces of vehicles, in an attempt to defend their territory against a supposed intruder (Roerig 2013, Mayntz 2018). Given that most organisms respond to mirror reflections as if their image represented another individual (Gallup-Jr. 1968), territorial birds assume it is a rival bird and attack the reflection to drive it away, particularly during breeding season when birds competitive drive is highest (Temby 2003, Mayntz 2018). In response to the supposed intruder, birds fly against the reflection, peck at it, rake it with their talons, scratch it with their nails, or beat it with their wings. While these actions apparently do not cause severe injuries, they can lead to exhaustion, and make the bird more vulnerable to diseases, malnutrition, predators, and even cause its death. After a complete day of shadow boxing, a Common Starling *Sturnus vulgaris* was found dead the next morning in Europe (Gough 1936). The degree of aggression and duration of the attacks vary for each bird species and even for individual birds, but usually disappear after the breeding season has ended (Mayntz 2018). Although this behavior is expected from males, females are occasionally involved (Robertson 1935, Reed 1938, Sutton 1947), sometimes in company of their males (Roerig 2013).

While the "shadow boxing" term was coined by Dickey (1916), its formal reports started with Allen (1879) as an "odd behavior" observed in a Robin *Turdus migratorius* and an American Yellow Warbler *Setophaga aestiva* from North America. Recent data about wild bird species that are known to attack themselves as reflections involve 143 bird species worldwide (Roerig 2013). Nonetheless, that inventory only contains an isolated report for the Neotropical region, corresponding to the Smooth-billed Ani *Crotophaga ani* (Davis 1940). In Venezuela, the Great Thrush *Turdus fuscater* is the only species known to shadow box (Verea *et al*. 2016). In this context, the current paper aims to improve the almost absent information about this topic in Venezuela and the Neotropical region.

Between December 2014 and January 2018 visual observations concerning shadow boxing behavior in wild bird species were randomly recorded. All data came from two close localities in Cordillera de la Costa mountains, southeast suburbs of Caracas, El Hatillo County, Miranda state, northern Venezuela: Los Naranjos farm (10°26'14''N; 66°47'27''W), a disturbed area about 900 m a.s.l.; and El Volcán area (10°25'30''N; 66°51'04''W), a relic cloud forest about 1320 m a.s.l. For each case, a reflecting surface was recorded. Due to strong relation between shadow boxing behavior and breeding season, the date of records (month) were compared with the

Figure 1. After noticing its reflection (**A**), a Rusty-margined Flycatcher *Myiozetetes cayanensis* pecks at it, scratches it with its nails (**B**) and beats it with its wings (**C**). Photo author: C. Verea.

Figure 2. A Tropical Parula *Setophaga pitiayumi* rests on a car rear view mirror while shadow boxing in northern Venezuela. Photo author: E. Mayor.

breeding periods of the bird species in Cordillera de la Costa bio-region based on Schäfer & Phelps (1954), Verea *et al.* (2009, 2016) and Verea (2016). Additionally, information associated to breeding behavior, such as nest presence, birds carrying nest material and/or food for fledglings were recorded as evidence of breeding activity. When possible (*e.g.*, dichromatic species) the bird sex was reported. Typical bird attack elements (*e.g.*, beak, wings, feet, others) were also recorded.

A total of 16 novel wild bird species were found performing shadow boxing behavior (Table 1; Figs. 1 & 2). Families Trochilidae, Picidae, Tyrannidae, Corvidae, Turdidae, Mimidae, Thraupidae, Emberizidae, and Parulidae were represented. According the information harbored by Roerig (2013), Trochilidae and Tyrannidae are reported for the first time. In most cases (12) the reflecting surfaces were vehicle components (windows, windscreens, rear view mirrors, and/or polished surfaces); four records were associated to home windows; other four records were associated to a glass sliding door; and a curious case involved a stainless steel pot. With the exception of the latter, all mentioned reflecting surfaces have been typically used by birds for shadow boxing (Roerig 2013). In all cases, one individual was involved, but the Rusty-margined Flycatcher *Myiozetetes cayanensis* eventually included two, undoubtedly male and female. After shadow boxing, both Rusty-margined Flycatchers flew up to the branch tree where their nest was built. Also, a single female of the Sooty-capped Hermit *Phaethornis augusti* with an active nest was recorded. Although this hermit does not show sexual dichromatism/dimorphism, it is a communal display (lek) bird. Thus, the entire reproduction effort rests on the female (Verea 2016). Female taking part of shadow boxing events represents only 13% of total species (Roerig 2013).

As expected, date of records and breeding season information matched in all species (Table 1). Additionally, Sooty-capped Hermit, Red-crowned Woodpecker *Melanerpes rubricapillus*, Social Flycatcher *Myiozetetes similis*, Rusty-margined Flycatcher, Great Kiskadee *Pitangus sulphuratus*, Spectacled Thrush *Turdus nudigenis*, Pale-vented Thrush *Turdus leucomelas*, and Black-faced Grassquit *Tiaris bicolor* had nests in the area. Likewise, the Burnished-buff Tanager *Tangara cayana*, Spectacled Thrush, Pale-vented Thrush, Black-striped Sparrow *Arremonops conirostris*, Blue-black Grassquit *Volatinia jacarina* and the Tropical Parula *Setophaga pitiayumi* were usually observed carrying food for fledglings and/or materials for nest construction at the same period of boxing. Nonetheless, the White-vented Plumeleteer *Chalybura buffonii* behavior does not seem related to its breeding season. Instead, this species was supposedly shadow boxing to defend a food source. A hummingbird food dispenser was daily defended for the mentioned hummingbird. All conspecific hummingbirds (Trochilidae) or others (*e.g.*, Bananaquit *Coereba flaveola*) were toughly repelled when they tried to approach the food dispenser. From time to time, the White-vented Plumeleteer flew in front of a nearby glass sliding door and attacked its own reflection as well. On the other hand, a few records of shadow boxing were recorded outside the breeding season (Table 1), corresponding to the Rusty-marginated Flycatcher (October–November), Green Jay *Cyanocorax yncas* (November), and the Burnished-buff Tanager (December), despite elsewhere shadow boxing behavior is known to occur at any time of the year (Temby 2003, Roerig 2013).

While most birds shadow box aggressively with their beak, wings and feet, Trochilidae species developed aerial displays, and beat their reflections with the breast and

Table 1. Bird species performing shadow boxing behavior in Venezuela. Data included previous report of the Great Thrush, Mérida region, Andean mountains of Venezuela (Verea *et al.* 2016). Breeding season data for Cordillera de la Costa bio-region according to Schäfer & Phelps (1954), Verea *et al.* (2009, 2016) and Verea (2016). Taxonomy sequence and nomenclature follow Remsen-Jr. *et al.* (2018).

Family/Species	Reflecting surface	Month(s) of record(s)	Breeding season
Trochilidae			
Sooty-capped Hermit (♀) *Phaethornis augusti*	Glass sliding doors.	January–June	December–July
White-vented Plumeleteer (♂) *Chalybura buffonii*	Glass sliding doors.	January–March	Throughout the year
Picidae			
Red-crowned Woodpecker (♂) *Melanerpes rubricapillus*	Car components: windows, windscreens, and polished surfaces.	March	November–July
Tyrannidae			
Social Flycatcher *Myiozetetes similis*	Car components: windows, windscreens, rear view mirrors, and polished surfaces; home windows.	February–March	January–August
Rusty-margined Flycatcher *Myiozetetes cayanensis*	Car components: windows, windscreens, rear view mirrors, and polished surfaces; home windows and glass sliding doors.	February–March; May–June; October–November	March–July
Great Kiskadee *Pitangus sulphuratus*	Car components: windows, windscreens, rear view mirrors, and polished surfaces.	April–May	March–June
Corvidae			
Green Jay *Cyanocorax yncas*	Home windows.	June; November	April–June
Turdidae			
Great Thrush (♂) *Turdus fuscater*	Car components: windows, windscreens, and rear view mirrors.	August	February–October
Spectacled Thrush *Turdus nudigenis*	Car components: windows and windscreens.	April–July	February–August
Pale-vented Thrush *Turdus leucomelas*	Car components: windows and windscreens.	May–July	Throughout the year
Mimidae			
Tropical Mockingbird *Mimus gilvus*	Car components: windows, windscreens, rear view mirrors, and polished surfaces; home windows.	March	Throughout the year
Thraupidae			
Burnished-buff Tanager *Tangara cayana*	Car components: windows and rear view mirrors; glass sliding doors.	February–March; December	March–May
Black-faced Grassquit (♂) *Tiaris bicolor*	Stainless steel pot.	March–April	May–September

Family/Species	Reflecting surface	Month(s) of record(s)	Breeding season
Blue-black Grassquit (♂) *Volatinia jacarina*	Car components: rear view mirrors.	June	April–October
Emberizidae			
Black-striped Sparrow *Arremonops conirostris*	Car components: windows, and rear view mirrors.	May–June	May
Parulidae			
Tropical Parula *Setophaga pitiayumi*	Car components: rear view mirrors.	June–July	March–August
Three-striped Warbler *Basileuterus tristriatus*	Car components: rear view mirrors.	June	March–June

beak. The White-vented Plumeleteer was flying steadily in front of its reflected image, and suddenly attacked it with a single breast and/or beak stroke. After a couple times, the hummingbird gave up and returned to its original spot. This strategy was observed two/three times a day. The Sooty-capped Hermit was less aggressive. When this species confronted its image, it moved up-and-down, and/or side to side. Simultaneously, the hummingbird uttered a couple "*chip*" warning notes. Then, it suddenly moved forward and touched the glass with its beak. After the contact, it moved backward and repeated the frontal attack one more time. Finally, it flew away.

Recorded information increases the data about wild bird that are known to performing shadow boxing behavior worldwide and noticeably improves its knowledge in Venezuela and the Neotropical region.

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ARTICLE

Enhancing our knowledge on the Ornate Hawk-Eagle (*Spizaetus ornatus*) through community-based monitoring records from tropical Mexico

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ABSTRACT: The Ornate Hawk-Eagle *Spizaetus ornatus* is a rare Neotropical raptor. In Mexico its distribution is irregular, its biology is poorly known, and it is considered to be threatened by extinction. We provide novel and supplementary information, resulting from community-based bird monitoring projects, on the natural history of the species from different regions of Mexico. We characterize the location of several nests of the species, describe a new altitudinal record for its presence and breeding range, and add information about its breeding habits and prey consumption. Anthropogenic disturbances that negatively affect the Ornate Hawk-Eagle mainly include land use change and hunting. Local and regional information on the species is essential to have a broad understanding of its biology and to improve the implementation of conservation strategies. Promoting community-based monitoring projects could enhance research capabilities and conservation efforts on this and other cryptic species of conservation concern.

KEY-WORDS: breeding cycle, citizen science, conservation, cryptic species, natural history, Neotropical raptor.

INTRODUCTION

The Ornate Hawk-Eagle *Spizaetus ornatus* is a rare Neotropical raptor that inhabits tropical forests from Mexico to Argentina (Brown 1976, Ferguson-Lees & Christie 2005, Bierregaard-Jr. *et al.* 2018). Its cryptic behavior and its preference for undisturbed, heavily-vegetated ecosystems, has hindered a complete understanding of its natural history (Iliff 2010). Although scarce, observations on its nesting and feeding habits are available from Central and South America (Kiff & Cunningham 1980, Lyon & Kuhnigk 1985, Klein *et al.* 1988, Naveda-Rodríguez 2004, Joenck *et al.* 2011, Phillips & Hatten 2013). However, the Ornate Hawk-Eagle is poorly known in Mexico, the northern limit of its range (Howell & Webb 1995). In this country, its distribution is irregular, almost no information exists about its natural history, and it is considered to be threatened by extinction (Aranda *et al.* 2009, SEMARNAT 2010). As a result, there is a need to gather biological data on the species to understand its general habits, its ecological plasticity, and its local habitat preferences (López-González *et al.* 2004, Aranda *et al.* 2009). Moreover, regional information on the species might provide the opportunity to contextualize local research and socio-political strategies for its conservation.

In this study we provide novel and supplementary information on the natural history of the Ornate Hawk-Eagle from different regions of Mexico. In particular, we characterize the location of several nests of the species that were found in distinct ecosystems. Moreover, we describe a new altitudinal record for the presence and the breeding range of the species. We also add information about its breeding habits and prey consumption. As this manuscript is a result of the collaboration between local bird monitors and ornithologists, we recommend the association between society and scientists through community-based biological monitoring projects to expand our knowledge of cryptic species of conservation concern.

The origin of the data

The information included in this manuscript comes from community-based bird monitoring projects performed in Mexico. For a detailed description of these projects see Ortega-Álvarez *et al.* (2012, 2015, 2018a, 2018b). Data was gathered by experienced local bird monitors during both casual sightings and bird monitoring surveys. Ornithologists assisted monitors in the course of these activities. Observations on the Ornate Hawk-Eagle were performed in three different regions of Mexico: Reserva de la Biosfera El Cielo (referred to as "El Cielo" hereafter), Reserva de la Biosfera Los Tuxtlas (referred to as "Los Tuxtlas" hereafter), and Sierra Juárez.

El Cielo is a natural area protected by the Mexican Government located at the state of Tamaulipas, northeastern Mexico (Gobierno del Estado de Tamaulipas 2013). It covers an area of 144.540 ha that includes tropical forests, scrublands, grasslands, Oak and Pine Forests, cloud forests, riparian vegetation, and secondary vegetation. It houses an important number of plant and animal species. Los Tuxtlas is located at the state of Veracruz, southeastern Mexico (CONANP 2006). It is a natural area protected by the Mexican Government that covers a surface of 155.122 ha. It is a very important reserve for its high biological diversity. The reserve is composed of different ecosystems, including tropical forests, cloud forests, Oak and Pine Forests, grasslands, mangroves, coastal dunes, and secondary vegetation. Finally, Sierra Juárez is a region located in the state of Oaxaca, southern Mexico, where indigenous and rural communities own and manage a large percentage of the most biologically important forests of Mexico (Anta-Fonseca & Merino 2003, Anta-Fonseca 2007). Main vegetation types in the region include tropical forests, cloud forests, Oak and Pine Forests, scrublands, and secondary vegetation.

Breeding biology of the Ornate Hawk-Eagle

The breeding biology of the Ornate Hawk-Eagle is still incomplete and it varies regionally (Iliff 2010). We detected and characterized the location of six nests of the species in different regions of tropical Mexico. Four of these nests were located in El Cielo, one in Los Tuxtlas, and one in Sierra Juaréz (Table 1). As reported by previous studies, nests were situated at mid to high-levels (mean ± standard error SE = 28 ± 2.55 m) below the canopy of tall trees (38.2 ± 3.19 m). Our observations at El Cielo suggest that Oak trees might be of primary importance for the species, even among different ecosystems (*e.g.*, Pine-Oak Forests, cloud forests, tropical medium semideciduous forests). Although most nests were found in forested areas set aside for conservation purposes, the nest of Los Tuxtlas was established in a restored site. This site was previously used for ranging livestock about 25 years ago. All the local vegetation was removed at that time, with exception of the current nesting tree. The restored site is now covered by secondary vegetation. This suggests that the Ornate Hawk-Eagle might not be completely dependent on old forests, and may be keen to use restored areas for breeding.

The literature mentions that this raptor has a clutch size of a single egg under natural conditions (Kiff & Cunningham 1980). Nevertheless, we detected two young birds at the nests of Sierra Juárez and El Cielo. This suggests that the species might be able to have a larger clutch size if natural conditions are favorable (*e.g.*, availability of prey), as found for other birds of prey (Olsen & Marples 1992). However, we also observed that a unique chick survived and developed into a juvenile when eagles had a clutch size of two. Similar to other raptors, mortality of chicks might be associated with food supply, prey density, and cainism (Collopy 1984, Janes 1985, Simmons 1988). The breeding pairs that we recorded nested only once per year. As the timing of breeding of the Ornate Hawk-Eagle varies throughout America (Iliff 2010), in Table 2 we provide a general description of its breeding cycle according to our notes from tropical Mexico.

Altitudinal distribution

The Ornate Hawk-Eagle regularly ranges from the sea level to 1800 m a.s.l. (Iliff 2010). However, wanderers have been recorded in Costa Rica as high as 3000 m a.s.l. (Stiles & Skutch 1989). Wandering individuals are usually immatures, which are likely to disperse away from breeding areas (Iliff 2010); we still regularly recorded adult individuals in Oak and Pine Forests at Sierra Juárez from 2300 to 2900 m a.s.l. Moreover, the nest that we found in this region was located at 2307 m a.s.l. (Table 1). This suggests that the species ranges and breeds at higher altitudes, at least in some regions of its northern range.

Hunting and prey observations

According to the literature, this species mainly feeds on avian prey. Nevertheless, it also captures mammals, lizards, and even snakes (Klein *et al.* 1988, Clinton-Eitniear *et*

Table 1. Habitat characterization of the nests of the Ornate Hawk-Eagle (*Spizaetus ornatus*) found in tropical Mexico. All nests were active, thus their precise locations are not provided for conservation purposes. The height, diameter, and species' name of the tree that supports the nest are specified. Nest height represents the distance between the ground and the base of the nest. The age of the nest represents the number of years that have passed since the nest was found up to mid-2018. **Nest "1" was relocated by the breeding couple about two years ago. The previous nesting site was located about 50 m away from the actual site, and it was used by the couple for at least 15 years.

Habitat trait	**Nest ID number**					
	1	**2**	**3**	**4**	**5**	**6**
Region	El Cielo	El Cielo	El Cielo	El Cielo	Los Tuxtlas	Sierra Juárez
Altitude (m a.s.l.)	835	714	897	1445	251	2307
Land use	Conservation	Conservation	Conservation	Conservation	Restoration	Conservation
Supporting tree	*Quercus germana*	*Quercus germana*	*Quercus germana*	*Quercus germana*	-	*Pinus pseudostrobus*
Tree height (m)	35	26	38	40	50	40
Tree diameter (m)	1.2	1.6	2.0	1.9	-	1.3
Nest height (m)	30	20	30	35	-	25
Nest age (years)	2**	7	10	3	2	3
Vegetation	Tropical medium semideciduous forest	Tropical medium semideciduous forest	Cloud forest	Pine-Oak Forest	Tropical Rainforest	Oak-Pine Forest
Dominant trees	Fig (*Ficus* sp.), Oak (*Quercus* spp.)	Fig (*Ficus* sp.)	Redgum (*Liquidambar* sp.), Oak (*Quercus* spp.), Ash (*Fraxinus* sp.), Avocado (*Persea* sp.), *Podocarpus* sp.	Pine (*Pinus* spp.), Oak (*Quercus* spp.), Cypress (*Cupressus* sp.)	*Heliocarpus appendiculatus*, *Cupania macrophylla*, *Senna multijuga*	Pine (*Pinus* spp.), Oak (*Quercus* spp.), Alder (*Alnus* sp.), Avocado (*Persea* sp.), *Oreopanax* sp.

al. 1991, Acosta-Chaves *et al.* 2012, Whitacre 2012). In the regions where we performed our observations, we recorded the Ornate Hawk-Eagle preying largely on birds, including Great Curassow (*Crax rubra*), Crested Guan (*Penelope purpurascens*), Military Macaw (*Ara militaris*), Cattle Egret (*Bubulcus ibis*), White-tipped Dove (*Leptotila verreauxi*), Red-billed Pigeon (*Patagioenas flavirostris*), Tuxtla Quail-Dove (*Zentrygon carrikeri*), tinamous (Tinamidae), and domestic poultry. Still, the eagle occasionally takes as prey White-nosed Coati (*Nasua narica*), squirrels (Sciuridae), rabbits (Leporidae), lizards, and snakes.

The Ornate Hawk-Eagle remains silent and immobile below top of the forest canopy when it hunts, as mentioned by Brown (1976) and Ferguson-Lees & Christie (2005). However, it usually flies in circles above the forest when it moves from one hunting ground to another. We have recorded intra-specific agonistic interactions for the species, particularly among individuals of different ages (*i.e.*, adults *vs.* juveniles), which might be related with dominance relationships and territoriality (Griffin 1981, Rothfels & Lein 1983). However, we did not observe negative interactions between the Ornate Hawk-Eagle and other raptor species. In fact, we have seen the Ornate Hawk-Eagle sharing hunting territories with Short-tailed Hawks (*Buteo brachyurus*), Gray Hawks (*Buteo plagiatus*), Solitary Eagles (*Buteogallus solitarius*), and White Hawks (*Pseudastur albicollis*). Moreover, we have recorded nests of Gray and White Hawks closely located to those of the Ornate Hawk-Eagles, suggesting that such species also share their breeding grounds.

Conservation concerns

We have observed different human activities that have both positive and negative effects on the Ornate Hawk-Eagle. For instance, ecological restoration initiatives performed by local communities in Los Tuxtlas may provide suitable nesting and foraging sites for the species, as it has been observed nesting and hunting in restored sites that were previously used for ranging livestock. Moreover, as evidenced by camera traps (Fig. 1A, B), the construction of water fountains by communities in El Cielo has proven to be successful in attracting Ornate Hawk-Eagles and other animal species, as this type of infrastructure provides important water supplies for wildlife, mainly during the dry season.

Anthropogenic disturbances occurring within our study sites that negatively affect the Ornate Hawk-Eagle mainly include land use change and hunting. The conversion of forests to rangelands, cropfields, and urban settlements represents a key force (Cairns *et al.*

2000) reducing the habitat for the species. In addition, hunting is another threat to the Ornate Hawk-Eagle as it is both appreciated as a trophy (Iñigo-Elías *et al.* 1987, Aranda *et al.* 2009, Forcey & Aragón 2009) and is sometimes perceived as a threat for poultry (Trinca *et al.* 2008), despite the fact that it rarely takes this type of prey. Furthermore, poaching on other animals might also indirectly affect this species, as we have seen it scared by hunting dogs. Nevertheless, more research should be performed to evaluate the actual effects of those disturbances associated with poaching (*e.g.*, noise, prey depletion, alteration of community structure; Dulvy *et al.* 2004, Chapron *et al.* 2008) on the Ornate Hawk-Eagle.

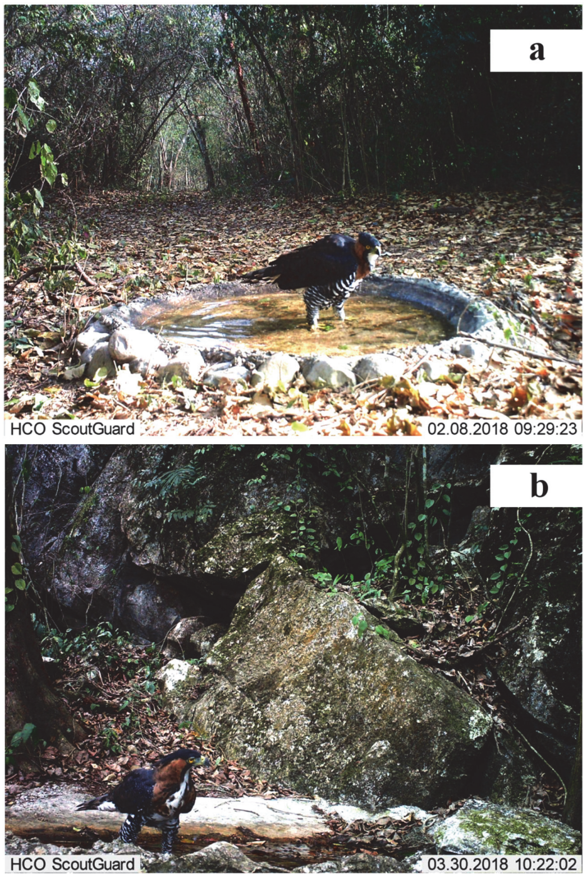

Figure 1. Ornate-Hawk Eagle using water fountains constructed by local communities in El Cielo. Photographs were obtained by camera traps.

Conclusions

Although our observations may be useful in improving our knowledge of the Ornate Hawk-Eagle, more systematic analyses are needed to fulfill our understanding of the species. We suggest that local and regional information on the Ornate Hawk-Eagle is essential to have a complete understanding of its biology and to improve the implementation of conservation strategies for protecting the species and its habitat. The promotion of community-based monitoring projects could be useful in enhancing the research capabilities and conservation efforts on this and other species throughout the region.

Table 2. Timing of breeding of the Ornate Hawk-Eagle (*Spizaetus ornatus*) in tropical Mexico.

Breeding event	Month	Observations
Courtship displays	February	-
Nest-building	February	The species might re-use the same nest for several years. Nest reconstruction is performed by the couple by using green branches of trees located at the surroundings of the old nest.
Mating	March	The couple mates for several times during this time of the year.
Egg-laying	March–April	-
Incubation	April	-
Hatching	April	-
	May	By this month, the chick can hold its head up and show up from the nest.
Fledging	August	The young starts to perform short-distance flights, always staying close to the nest. It is very noisy as it constantly calls the parents for food.
Juvenile explores surroundings	September–December	Juvenile is quite able to fly and starts to move away from the nest. However, it still receives food from the parents.
	January	The juvenile gets more silent and solitary. However, it is still possible to observe the juvenile and the parents together.
Juvenile independence	February–March	Parents force the juvenile to abandon the nesting area. They may attack the young if it refuses to leave. In extraordinary occasions, the juvenile manages to stay in the surroundings of the nest, even if the parents start to raise a new chick.

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ARTICLE

Discolored and worn-out plumage in juvenile Magellanic Penguins (*Spheniscus magellanicus*) found ashore in southeast and northeast Brazil

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ABSTRACT: Magellanic Penguins (*Spheniscus magellanicus*) are common winter visitors of the Brazilian continental shelf. In this study we report the occurrence of discolored and worn-out plumage in juvenile Magellanic Penguins washed ashore during summer on the southeast and northeast coast of Brazil. In the affected individuals, the areas of the plumage that would normally be black or dark grey were discolored to tones ranging from brown to cream-white, especially on the head and dorsum. Upon close examination, the feathers were often brittle and appeared "old" and worn-out, at times leading to irregular and asymmetric patches of feather-loss in the lower back. We propose five factors that could be involved in causing this condition: (a) molt skipping, (b) sun exposure, (c) malnutrition, (d) insufficient preening, and (e) chewing lice.

KEY-WORDS: chromatic aberration, feather-loss, molt, plumage, seabird, *Spheniscus demersus*.

INTRODUCTION

Magellanic Penguins (*Spheniscus magellanicus*) are native to Argentina, Chile and the Falkland/Malvinas Islands and are common visitors of the Uruguayan and Brazilian continental shelves during austral winter (Stokes *et al.* 2014). Magellanic Penguins will normally remain at sea during winter migration (Pütz *et al.* 2007), however a variable number of individuals, predominantly juveniles that are in poor body condition, have previously been reported to wash ashore on the Brazilian coast (García-Borboroglu *et al.* 2010, Rodrigues *et al.* 2010, Stokes *et al.* 2014). As occurs in other penguins, Magellanic Penguins undergo a rapid molt in which all their feathers are replaced over a period of 2–4 weeks (Williams 1995). During the molt, which in the Magellanic Penguin usually occurs between February and April, their plumage loses its waterproofing and as a result the penguins have to remain on land, fasting (Boersma *et al.* 2013b). Molting is therefore an energetically-demanding process that has to be preceded by a period of fattening (with an increase of up to 50–70% in body weight) (Williams 1995), and preparing for molt can be one of the key factors driving the annual cycle of penguins (Kemper & Roux 2005, Wolfaardt *et al.* 2009).

In March 2010, Petry *et al.* (2017) photographed a juvenile Magellanic Penguin with light brown plumage that had been found ashore on the coast of Rio Grande do Sul state, Brazil. The authors interpreted this aberrant plumage color as corresponding to the first case of a brown mutation in Magellanic Penguins. Brown mutation is a color aberration related to a qualitative reduction of eumelanin (*e.g.*, incomplete synthesis or oxidation), and as a result the black areas of the plumage shift to a light brown tone (van Grouw 2013). In this study we report the presence of juvenile Magellanic Penguins with varying levels of plumage discoloration and feather-loss, some of which closely resemble the brown-plumaged penguin photographed by Petry *et al.* (2017), however we propose a distinct etiology for this phenomenon.

METHODS

The Institute of Research and Rehabilitation of Marine Animals (*Instituto de Pesquisa e Reabilitação de Animais*

Marinhos – IPRAM) is a non-profit organization based in Cariacica (20º19'54''S; 40º21'38''W), Espírito Santo state, that rescues and rehabilitates marine animals found ashore along the coast of southern Bahia (northeast region), Espírito Santo and northern Rio de Janeiro states (southeast region), Brazil. An average of 110 Magellanic Penguins are admitted for rehabilitation per year, a majority of which are juveniles (98%) that are severely debilitated (lethargic/comatose, severely emaciated, dehydrated, anemic and hypoglycemic).

Most penguins (78%) are admitted from July to September, whereas a smaller proportion (22%) is admitted from October to June. In addition to the general state of malnutrition and debilitation that is common to nearly all juvenile penguins found ashore in this region, the juvenile penguins admitted from October to March every year also frequently present a discolored and worn-out plumage (Fig. 1).

RESULTS AND DISCUSSION

From a sample of 33 penguins admitted from the northern coast of Rio de Janeiro between October and December 2015, 15 penguins (45%) had plumage discoloration and/or patches of feather-loss (see Fig. 1B). In these cases, the areas of the plumage that would normally be black or dark grey are discolored to tones ranging from brown to cream-white. The discoloration is usually more pronounced on the head and dorsum. There are cases, however, where the

Figure 1. Discolored and worn-out plumage in juvenile Magellanic Penguins (*Spheniscus magellanicus*) admitted for rehabilitation along the coast of southeast and northeast Brazil. (**A & B**) examples of the large numbers of juvenile Magellanic Penguins with worn-out plumage; (**C–E**) a particularly extreme example of plumage discoloration; (**F–H**) examples of the different patterns of plumage wear, discoloration and feather-loss and feather replacement on the lower back. Photographs taken in Jan 2013 (**C–E**), Dec 2013 (**A**), and Dec 2015 (**B, F–H**). Photo authors: Renata Hurtado/IPRAM (A, B, F, G, H); Luís F. Mayorga/IPRAM (C, D, E).

discoloration is evenly distributed and all the feathers that would be black have a light brown color instead (Fig. 2A). Upon close examination, the feathers are often brittle and appear "old" and worn-out; in some areas, the barbules may be irregularly broken and the feather shaft is exposed. In many cases, there are irregular and asymmetric patches of feather-loss, especially in the lower back. The loss of feathers may lead the skin to be entirely exposed (*e.g.* Figs. 1E & 1G), but oftentimes a downy plumage grows to form a furry coat in areas where the normal plumage was lost (*e.g.* Figs. 1F & 1H).

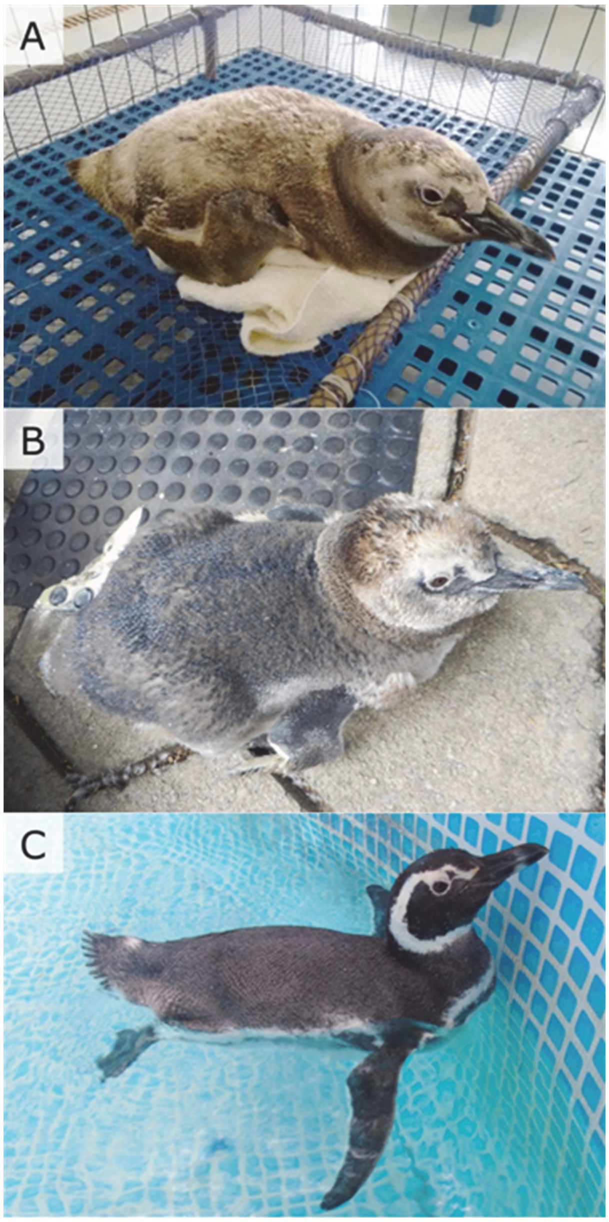

Figure 2. Example of an individual that was admitted with a brown juvenile plumage, underwent molt and emerged with normal adult plumage. (**A**) bird is lethargic and dehydrated upon admission, with a worn-out pale brown plumage (18 Mar 2017); (**B**) bird recovers gradually and undergoes molt (24 Mar 2017); (**C**) bird is fully recovered and completed the molt to a normal adult plumage (19 Apr 2017). Photo author: Luís F. Mayorga/IPRAM.

Despite their generally poor health status (dehydration, malnutrition, lethargy) and the poor condition of their plumage, the penguins with discolored plumage and feather-loss usually respond well to rehabilitation. After a few weeks under care and receiving adequate nutrition (fresh fish and mineral/vitamin supplementation) and deworming medicine, these birds will usually initiate the molt. In a few cases, the penguins with discolored plumage are not debilitated upon admission and instead show signs of pre-molt (good body condition, flipper edema, lethargy). In all cases admitted at IPRAM, when penguins with discolored plumaged completed the molt they emerged with an entirely normal black-and-white adult plumage (Fig. 2). If this plumage discoloration had a genetic basis it would be expected that the brown/cream-white color would be maintained even after molt, and we therefore consider that factors other than genetic mutations must be at play.

Because the plumage discoloration we observed in juvenile Magellanic Penguins is invariably accompanied by other signs of poor plumage quality (*e.g.*, worn-out appearance of feathers, patches of feather-loss) and appears to be seasonally distributed, we suggest it is primarily related to feather wear. We propose five factors that could synergize to cause this condition: (a) molt skipping, (b) sun exposure, (c) malnutrition, (d) insufficient preening, and (e) chewing lice.

Juvenile African Penguins (*Spheniscus demersus*) with a light brown and worn-out plumage (Fig. 3) are routinely admitted during summer months at the South African Foundation for the Conservation of Coastal Birds (SANCCOB), in South Africa; these individuals will also invariably emerge with a normal black-and-white adult plumage after molt (R. Hurtado, pers. obs.). In a study on the molting ecology of African Penguins in Namibia, Kemper & Roux (2005) found that some juvenile African Penguins may skip the first molting season and retain

Figure 3. A juvenile African Penguin (*Spheniscus demersus*) with a discolored and worn-out plumage admitted for rehabilitation at the Southern African Foundation for the Conservation of Coastal Birds, South Africa (Dec 2017). Photo author: Renata Hurtado/SANCCOB.

their juvenile plumage until 20–22 months of age. These individuals are referred to as "skippers", and their plumage is badly worn and not fully waterproof, jeopardizing their ability to forage in cold waters. Juvenile Magellanic Penguins have been occasionally seen in the coastal waters of Rio de Janeiro during summer months (R. Hurtado, pers. obs.), possibly in an attempt to forage in the Cabo Frio upwelling waters. Considering that the nearest breeding colony of Magellanic Penguins is almost 3000 km away from the coast of Rio de Janeiro (Boersma *et al.* 2013b), it is reasonable to suspect that these individuals might not return to their colonies in time to undergo molt in February/March. If this is the case, the plumage of these individuals can be expected to be considerably worn-out by the summer of the subsequent year. We therefore suspect that the cases of plumage discoloration and feather-loss we documented in juvenile Magellanic Penguins in this study represents a situation comparable to the African Penguin skippers, *i.e.* extreme instances of feather wear related to juvenile Magellanic Penguins that skipped their first-year molt.

Considering that the body parts that are usually most intensely discolored are those that stay outside of the water when a penguin swims (see Fig. 1A), prolonged exposure to the sun could also play a role. For instance, the Galapagos Penguin (*Spheniscus mendiculus*) is the northernmost-breeding penguin species and its gray-black plumage is known to gradually progress to a brown tone during the months following molt (Boersma *et al.* 2013a). This species is unique among penguins in that its adults molt twice per year (Boersma *et al.* 2013a), possibly an adaptation to the intense feather wear caused by high solar irradiance near the Equator. Considering that brown plumage discoloration is relatively common in juvenile Magellanic Penguins in northeast and southeast Brazil whereas it appears to be rare in individuals found ashore in southern Brazil (L. Bugoni, pers. comm.), it is possible that plumage discoloration is more frequent in individuals wintering at lower latitudes is related to the Equatorward increase in solar irradiance.

The oily secretion produced by the uropygial gland plays an important role in reducing feather wear, inhibiting chewing lice and feather-degrading bacteria (Shawkey *et al.* 2003, Moreno-Rueda 2010, 2011). Boersma *et al.* (2013a) speculated that the plumage of Galapagos Penguins becomes brown in the period preceding molt because the penguins stop oiling their feathers. Juvenile Magellanic Penguins admitted for rehabilitation in northeast and southeast Brazil have undergone extended periods of malnutrition, as evidenced by the generally poor body condition and health status. It is therefore possible that malnourished juvenile penguins have decreased quantity or quality of uropygial gland secretion, resulting in poorer protection from feather wear. Additionally, it is known that penguins adjust their foraging schedule in response to prey availability, and in extreme circumstances of shortage of prey some individuals may forage up to 15 h per day, *i.e.* non-stop foraging from dawn to dusk (Culik *et al.* 2000). In these instances, the increased time spent foraging will certainly come at the cost of a decreased time preening, and feather quality is likely to deteriorate as a result. Furthermore, it is also possible that these juvenile individuals had received suboptimal nutrition as chicks, which could have resulted in poor quality feathers that were more susceptible to discoloration and wear.

Chewing lice (*Austrogoniodes* sp.) are common in juvenile Magellanic Penguins on the southeast coast of Brazil, and in some instances they can be found in >95% of carcasses washed ashore (R.E.T. Vanstreels, unpub. data). Chewing lice can cause direct damage to the feathers and accelerate their wear (Kose *et al.* 1999), and can also lead to feather damage indirectly by inducing feather-damaging behavior (van Zeeland & Schoemaker 2014). While it is unlikely that chewing lice cause plumage discoloration, it seems plausible that they might have contributed directly or indirectly to the patches of feather-loss reported in this study.

It is worth noting that Traisnel *et al.* (2018) documented an adult African Penguin whose black plumage had been uniformly replaced by a light brown tone; this case was considered consistent with brown mutation, and the dorsal plumage of that individual was also heavily bleached out. This suggests that in cases of brown mutation, the decreased oxidization of the eumelanin might also make the plumage more susceptible to sun-mediated discoloration. In the case of the juvenile Magellanic Penguins in this study, it is plausible that the eumelanin in the feathers of juveniles may be less oxidized that in the feathers of adults, resulting in an increased susceptibility to discoloration.

In conclusion, juvenile Magellanic Penguins found ashore in southeast and northeast Brazil during summer months frequently present a discolored and worn-out plumage. It seems unlikely that genetic mutations are the cause of these plumage abnormalities. We propose, instead, that the plumage abnormalities we documented are the result of feather wear due to a combination of factors related to the challenges experienced by these birds during their first-year migration.

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SHORT-COMMUNICATION

A completely leucistic Rufous-bellied Thrush (*Turdus rufiventris*) breeding successfully in central-east Argentina

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ABSTRACT: Leucism is a color aberration characterized by the absence of pigmentation which can either be partial or complete. Abnormally colored birds have reduced chances of survival and mating success compared to normally colored individuals. We present a documented record of a complete leucistic adult Rufous-bellied Thrush (*Turdus rufiventris*) breeding successfully in Cariló, central-east Argentina. In the winter of 2016 we observed a completely white thrush. In the subsequent spring we observed it collecting food and delivering it to two fledglings, which were normally colored. The adult thrush survived its own post-fledging period despite its increased predation risk due to conspicuousness, managed to get a breeding pair and breed successfully. Since reports of abnormally colored birds breeding in wild populations are rare, we emphasize the importance of making this information available.

KEY-WORDS: color abnormalities, leucism, Neotropic, plumage coloration, reproductive biology.

Color abnormalities are well known phenomena in birds, although most cases are not described in literature (Gonçalvez-Jr. *et al*. 2008). Leucism produces individuals with white feathers, and this condition can either be partial or complete (totally white plumage), in which case it can be mistaken for albinism (a complete lack of melanin, including feathers, bill, legs and eyes) (van Grouw 2013). Adult leucistic birds are rarely found in the wild (Bensch *et al*. 2000), as they usually have a lower survival rate compared to normally colored individuals (Møller *et al*. 2013). These birds may suffer harassment by conspecifics and they can have deficiencies in how they reflect solar energy during early development stages (Slagsvold *et al*. 1988, Konter 2015). They are also prone to predation due to their conspicuousness (Santos 1981, Slagsvold *et al*. 1988, Gonçalvez-Jr. *et al*. 2008) and, since avian sexual selection is linked to coloration in most species (Hill 2006), their mating success is usually compromised (Truax & Siegel 1982). Besides visual perception of color, the lack of pigments also affects the structural properties of feathers (Bortolotti 2006). In this sense, Burtt-Jr. (1986) demonstrated that feathers containing melanin could resist abrasion for longer periods of time than white feathers, and Schreiber *et al*. (2006) reported an albino bird that could complete its nestling stage, but one year after fledging it was unable to fly due to a high degree of degradation in all its feathers. In this communication, we provide evidence that a completely leucistic bird could survive a full winter and breed successfully despite the potential disadvantages produced by the absence of pigmentation.

Observations occurred while carrying out a bird survey in Cariló, Buenos Aires province, Argentina (37º09'S; 56º54'W) between 2016 and 2017. The area is a semi-urban touristic beach with abundant exotic forest plantations, mainly dominated by *Pinus* spp. On 26 and 27 June 2016 (winter in the southern hemisphere) we observed on multiple occasions a completely leucistic Rufous-bellied Thrush (*Turdus rufiventris*) foraging alongside conspecifics. The specimen was seen on the street and inside house gardens surrounded by hedges. Four months later, during the immediate spring (10 October 2016), we observed the specimen in the same area collecting worms on the ground (Fig. 1A) and delivering them to a house garden hedge. We searched on the shrubs and detected two Rufous-bellied Thrush fledglings among the branches, which had no signs of color aberrations (Fig. 1B). The next day we went back to carefully survey the area and again found the two fledglings and an abandoned Rufous-bellied Thrush nest (an open nest made up of twigs, mud and leaves), placed deep inside an Oleander (*Nerium oleander*) shrub in a hedge between two properties (nest height: 1.9 m). Due to the remaining fecal sacs under the nest, we assumed

Figure 1. Leucistic Rufous-bellied Thrush (*Turdus rufiventris*) collecting worms on the ground in Cariló, central-east Argentina (**A**) and one of its fledglings observed in the nesting site (**B**). Photo author: Martín A. Colombo.

that the fledglings hatched in the nest.

Genus *Turdus* has some records of abnormally colored individuals in South America, most of them corresponding to partial leucism and only a few to complete leucism (Gonçalvez-Jr. *et al.* 2008, Azarri *et al.* 2011, Fuentes & González-Acuña 2011, Cadena-Ortiz *et al.* 2015). However, in most records there is no further monitoring of the aberrant colored birds and their fate is unknown. Gonçalvez-Jr. *et al.* (2008) reported another complete leucistic thrush engaging in nesting activities, but no further information was provided. Records of these birds successfully mating and breeding are especially rare in literature.

A completely white adult thrush indicates that it was able to survive the immediate post-fledging period, a stage of high risk of mortality (Cox *et al.* 2014). In this sense, Slagsvold *et al.* (1988) found that the frequency of leucism cases in *Corvus corone* was significantly higher at younger ages. However, the observed thrush overcame the increased predation risk associated with its conspicuousness (Gonçalvez-Jr. *et al.* 2008) and also managed to get a breeding pair (we could not determine the sex of the leucistic thrush). Truax & Siegel (1982) reported that melanin-based plumage coloration was a major factor in sexual selection, as they found that Japanese Quail (*Coturnix japonica*) males avoided mating with leucistic and albino females, and this preference disappeared when those females were painted dark (see also Parker *et al.* 2003, Galván & Møller 2009). Our thrush mated and bred successfully despite all the potential disadvantages and the reduced fitness induced by complete leucism, indicating that this aberrant condition was not an obstacle for its own survival, nor for its offspring. Since finding complete leucistic adult birds is unusual in wild populations, we emphasize the importance of making this type of information available, especially if it provides insights about the reproductive fitness of leucistic individuals, in order to better understand the ecological and evolutionary significance of these types of color abnormalities.

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SHORT-COMMUNICATION

The Azure Jay *Cyanocorax caeruleus* (Aves: Corvidae) in Paraguay, with restriction of the type locality

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ABSTRACT: *Cyanocorax caeruleus* (Vieillot, 1818) is based on the description by Azara of number 55 Urraca Celeste and has traditionally been ascribed the type locality "Paraguay". However, Azara based his description on captive birds and a lack of reliable records from the country meant that it was recently eliminated from the official country avifaunal list. Here we provide a discussion of previous reports of the species in Paraguay to vindicate that decision. We also provide the first documented records of the species from Paraguay from the same general area that Azara described as its distribution, thereby reaffirming the accuracy of that work. We also suggest a restricted type locality of "Itapúa department, Paraguay at 27°S latitude" for the species which more accurately reflects these results.

KEY-WORDS: *Cyanocorax cyanomelas*, distribution, occurrence, Purplish Jay, type locality.

The Azure Jay *Cyanocorax caeruleus* (Vieillot, 1818), is a "Near Threatened" Atlantic Forest endemic corvid with recent records from southeastern Brazil (Paraná, Rio Grande do Sul, Santa Catarina, and São Paulo states), extreme northeastern Uruguay (Cerro Largo) and northeastern Argentina. In Argentina it is mainly found in the northeast of Misiones province around San Antonio and San Pedro with a possible subpopulation along the Arroyo Martires to Concepción de la Sierra, and occurs marginally into Corrientes province. Published references to Formosa and Chaco provinces are misidentifications (Anjos *et al.* 2009, M. Pearman, pers. comm.). Although the type locality of the species is Paraguay (Vieillot 1818), and the species is frequently listed in the Paraguayan avifauna (Goodwin 1986, Madge & Burn 1994, Anjos *et al.* 2009), the lack of confirmed records meant that it was recently downgraded to of "possible" occurrence in Paraguay (del Castillo 2013). However, del Castillo (2013) did not discuss the reasons for taking those measures. Here we elucidate the case for its removal from the list and document the first confirmed record of the species in Paraguay to reinstate the species to the country list.

Historical reports

Vieillot (1818) described *Pica caeruleus* based on Azara's (1802) number 55 Urraca Celeste (Volume 1, p. 259). Azara's description of the bird clearly refers to this species, it being distinguished adequately from the number 54 Urraca Morada or Purplish Jay *Cyanocorax cyanomelas*. In his introduction to the family Azara stated that Azure Jay only occurs around 27°S latitude, corresponding to the extreme south of modern day Paraguay including the southern portions of Itapúa, Misiones and Ñeembucú departments. Based on what is known of the ecological requirements of the species it would seem that the Atlantic Forest habitat of Itapúa department is most conducive to the species, with the Humid Chaco, marshes and flooded grasslands of Ñeembucú unlikely to have ever harboured populations. The historical distribution of the species can thus at best be presumed to have been very restricted in Paraguay, but given the inaccuracies of geolocation at that time this should be taken as approximate. Unfortunately, in the species account of number 55 Urraca Celeste, Azara describes a captive bird, and does not specifically state where it was obtained from – it should also be remembered that in Azara's time Paraguayan territory

Figure 1. Adult Azure Jay *Cyanocorax caeruleus*, Puerto Hohenau, 07 January 2018 (**A**). Photo author: N. Argentini. Presumably the same individual in flight, Puerto Hohenau, 09 January 2018 (**B**). Photo author: S.D. Ríos.

was larger, incorporating much of the now Argentine Misiones province. Berlepsch (1887) and Bertoni (1901) cited Azara as the basis for their inclusion of the species in the Paraguayan avifauna.

In much of the early literature there was a clear confusion between this species and Purplish Jay *C. cyanomelas*. Salvadori (1895) notes specimens of "*C. caeruleus*" from the Río Apa, area of northern Concepción department and Kerr (1892) reported the species as "very common" along the Pilcomayo River in Presidente Hayes department, citing a now lost specimen collected at Fortín Page (24º47'S; 58º45'W) (10 September 1890). Similarly, Kerr (1901) described the species as "nearly as numerous as *C. chrysops*" at Villa Concepción (23º24'09''S; 57º26'29''W), Concepción department and flocks of "seven or eight" individuals on 15 and 21 January 1897 at Waikthlatingmayalwa (= Misión Inglesa, 23º26'60''S; 58º13'60''W), Presidente Hayes department. However, the palm savannas and gallery forests that typify the Humid Chaco region explored by Kerr are completely different to the habitat preferred by the Azure Jay, and *C. cyanomelas* is common there to this day.

Oberholser (1902) reported an undated specimen of *C. heckelii* (= *C. caeruleus*) collected by William Foster at Sapucái (25º40'04''S; 56º57'20''W), Paraguarí department, but Hayes (1995) examined this specimen in the USNM and found it to be a *C. cyanomelas*. This specimen was also cited by von Ihering (1904) as his basis for including the species in the Paraguayan avifauna. Other specimens collected by Foster at the same locality during 1902 to 1904 and sent to the Natural History Museum, London, were identified as *C. caeruleus* by Chubb (1910), but Hayes (1995) confirmed that there are no Paraguayan specimens of Azure Jay in that museum. Grant (1911) then listed specimens from Humaitá (27º04'12''S; 58º30'08''W), Ñeembucú department (28 August 1909) and Curuzu Chica (= Antequera, 24º05'05''S; 57º11'50''W), San Pedro department (7 November 1909) describing it as "commonly observed north of Corrientes". Again the habitat where these specimens were collected and the inference of abundance strongly indicates that they are *C. cyanomelas* as Hayes (1995) surmised.

Bertoni (1914, 1939) listed the species in both editions of his Catálogos, but only in the second edition did he provide a locality of "southwest Paraguay", in reference to the Pilcomayo region and thus surely derived from Kerr (1892, 1901). Bertoni never claimed the species from the Atlantic Forests of Alto Paraná department where he resided for several decades, despite this being geographically and ecologically closer to the known range and requirements of the species. Other authors also listed

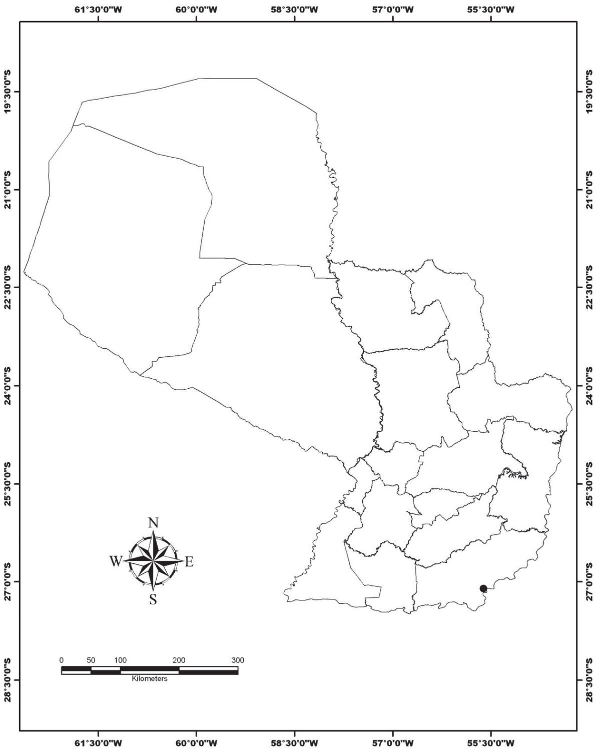

Figure 2. Puerto Hohenau, Itapúa department (27º08'S; 55º34'W), locality at which the species was observed in Paraguay.

the species for Paraguay (Laubmann 1940, Schmidt 1948, de Schauensee 1970, Dunning 1982, Contreras *et al.* 1990) but none provided any new information to justify the inclusion of *C. caeruleus* in the Paraguayan avifauna. The statement in Schade & Masi-Pallarés (1971) that the species is "very rare" was probably a reflection of the lack of information available rather than being based on actual reports.

Two more contemporary reports, albeit lacking documentation and exact localities, are by Contreras *et al.* (1989) from Lago Ypoá, Paraguarí department without details and two birds seen west of Ciudad del Este, Canindeyú department during August 1977 (Ridgely & Tudor 1989). Del Castillo *et al.* (2004, 2005) treated the species as pending documentation on the basis of the Ridgely sight record, but it was subsequently retracted by the observer (del Castillo 2013). At this point there existed no documented report of the species in Paraguay, no details to support the correct identification of any of the published claims (except that of Azara) and no records from the area which Azara (1802) had stated that the species was restricted to. This led to del Castillo (2013) downgrading the species from "pending documentation" to "of possible occurrence", in accordance with Hayes (1995).

New record

The first confirmed Paraguayan record of *C. caeruleus* is an individual photographed by N.A. at Puerto Hohenau, Itapúa department (27°08'S; 55°34'W) on 05 January 2018 around 7:00 h and it was subsequently observed by all the authors on 09 January 2018 at the same locality around 8:20 h. The bird was in the company of a small flock of Plush-crested Jay *Cyanocorax chrysops*, being initially shy and less vocal than its group mates. Only upon squeaking did it become agitated, at that point separating from the rest of the flock and calling loudly so that recordings of the call could be made by O.R. (Rodriguez 2018 as XC 399021 and XC 399022). The bird was still present on 31 March 2018 when it was seen by Sofía, Matthew and Rob Clay.

The presence of a single bird rather than a flock and the location of the observation on the banks of the Paraná River opposite Misiones, Argentina, are perhaps suggestive of a vagrant individual rather than a permanent population, and the owners of the property where the bird was observed, who have resided at the property for three decades, said that the bird had arrived some 6 months previous and had been there ever since (A. Brouwer, pers. comm.). The Paraná River is particularly narrow at this point (approximately 1.1 km wide) and E. Krauczuk (*in litt.*) notes that a small population of Azure Jay is present at Gobernador Roca, Misiones province, Argentina (27°11'S; 55°28'W), approximately 15 km distant from the Paraguay record. He stated that the species was previously regular at that locality, but has declined over the last decade, with very few individuals now being observed and typically in association with Plush-crested Jay. The causes of the decline are unknown.

Given the noisy and conspicuous nature of this species and the landowner›s unfamiliarity with the species, it would seem sufficient to raise questions about a permanent population at this locality. However, it should be noted that this record is from the same area described by Azara as the historical species range, and searches for the species in the surrounding area may provide further data about the status of the species in Paraguay.

Restriction of type locality

According to Article 76.1 (ICZN 1999) "the type locality of a nominal species-group taxon is the geographical (and, where relevant, stratigraphical) place of capture, collection or observation of the name-bearing type". In summary it acts to fix a scientific name to a defined geographical population so that it can be retained in the event of future taxonomic changes. Typically this accompanies the type specimen, but in the case of this species the "type" is Azara's (1802) description.

The formal scientific description of Vieillot (1818) was derived entirely from Azara's (1802) description, and the type locality of "Paraguay" was allocated by proxy of it being the country in which Azara resided. In fact, Azara provided more detailed information about the distribution of the species in Paraguay in the introduction to the family, stating that the species occurred "around 27°S latitude".

In the time of Azara Paraguayan territory was considerably greater, including much of what is today Misiones and Formosa provinces in Argentina, the land being ceded to Argentina as part of the reparations for the loss of the Triple Alliance War (1864–1870). Consequently, it is no longer clear whether the type locality of "Paraguay" provided by Vieillot even refers to Paraguay at all as currently understood. We consider that restriction of the type locality is desirable under ICZN Article 76A.2 (ICZN 1999). Article 76A.1.4. states that "as a last resort, and without prejudice to other clarification, localities within the known range of the taxon or from which specimens referred to the taxon had been taken" can be assigned as type locality. Given this new and reliable distributional data, we recommend that the type locality of this species be restricted to "Itapúa department, Paraguay at 27°S latitude", thereby maintaining the link with Azara›s original text, incorporating the only confirmed data about the species in Paraguay and negating the need for declaration of a neotype or more radical changes.

We highlight also the existence of syntypes in the

National Museum of Natural History, Leiden (RMNH 100787, 100788) (Dekker & Quaiser 2006) and in the Museum d›Histoire Naturelle de Paris (CG 2011-572, 2011-573) (Voisin & Voisin 2016) but consider that choosing a lectotype from these specimens unnecessarily breaks the historical link with Azara and note that none of these specimens is accompanied with precise locality data. Voisin & Voisin (2016) suggest that Vieillot may have examined the specimens included in their work justifying this with the statement that "Vieillot referred to the work of Azara (1809), cited a part of Azara's description and added a plumage description by himself". However this is a misunderstanding, as the original Azara (1802) description contains all of the information subsequently repeated by Vieillot (1818) and in fact uses identical adjectives to describe the plumage.

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SHORT-COMMUNICATION

New sandpiper from an interior sea: confirmation of Curlew Sandpiper (*Calidris ferruginea*) for Argentina

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ABSTRACT: We present the first documented record of the Curlew Sandpiper (*Calidris ferruginea*) for Argentina. On 17 October 2013, we photographed an individual of Curlew Sandpiper feeding in the south coast of Mar Chiquita inland sea, one of the biggest saline lakes of South America. Our finding of the Curlew Sandpiper confirms the presence of this species previously considered as hypothetical for Argentina.

KEY-WORDS: central Argentina, distribution, Mar Chiquita Lake, occurrence, shorebirds.

The family Scolopacidae comprises 91 species worldwide (Piersma & Bonan 2017). In Argentina, 27 species have been reported, while six are considered hypothetical, due to lack of collected specimens, proper pictures and/or sound records (Mazar-Barnett & Pearman 2001, Piersma & Bonan 2017). Most of species listed as hypothetical for Argentina belong to the genera *Calidris* (Mazar-Barnett & Pearman 2001), including the Curlew Sandpiper (*Calidris ferruginea*), historically reported to be present at the country's marine coast (Mazar-Barnett & Pearman 2001).

The Curlew Sandpiper breeds in coastal regions of central Siberia, and it is known wintering grounds are in west Africa to New Zealand (O'Brien *et al.* 2006, van Gils *et al.* 2017, Fig. 1). Movements across Europe after its breeding season generally take place in a southeastern direction from July till October (Hayman *et al.* 1986). In a review of the records of the Curlew Sandpiper within North America, Hanson (2006) emphasized that this species a regular spring migrant along the Atlantic and northern Pacific coast, rarely occurring at western Atlantic coastal areas south of United States and Canada. However, the Curlew Sandpiper occasionally visits Central America and the Caribbean (Hayman *et al.* 1986, Stiles & Skutch 1989, Raffaele *et al.* 1998). In South America, there are substantially less records of Curlew Sandpiper. Currently, six records from South American countries have been published: two from the Pacific coast of Ecuador and Peru, three from northeastern Brazil (Graves & Plenge

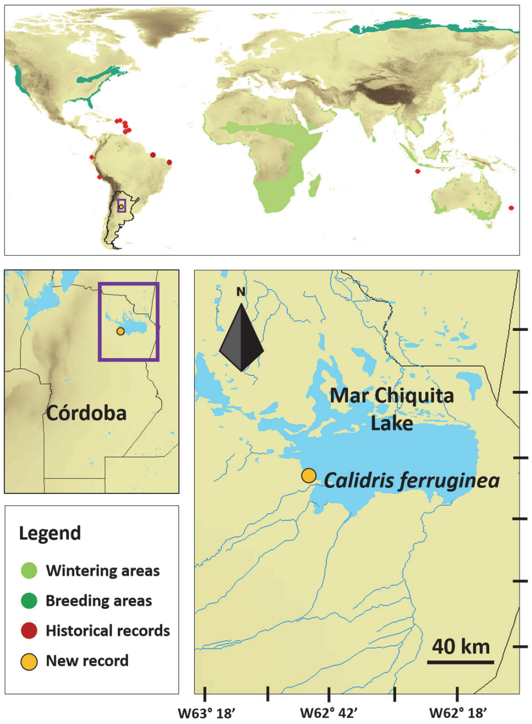

Figure 1. Distribution map for the Curlew Sandpiper (*Calidris ferruginea*). Light green color indicates wintering areas and dark green indicate the areas of presence during Spring–Summer. Red points show the historical records outside of what is considered the species range. The bottom map shows the location of Mar Chiquita Salt Lake and highlights the Argentinean record of Curlew Sandpiper (orange point). Map based on Piersma & Bonan (2017).

1978, Ridgely & Greenfield 2001, Musher *et al.* 2016), and for Argentina, Kovacs *et al.* (2005) mentioned that the only record proceed from a collected specimen in the Atlantic coast of Chubut province. Mazar-Barnett & Pearman (2001) considered this species as hypothetical for Argentina because the specimen collected by W. Burnett and Cap. Fitzroy in the east of Patagonia was not found in the British Museum of Natural History. Here, we report the first confirmed record of the Curlew Sandpiper for Argentina and listed it as a new sandpiper species for the inland Mar Chiquita Salt Lake. This record was supported by photographic material.

Mar Chiquita Salt Lake, is located in Córdoba province and present a different geological origin than the homonymous lake in Buenos Aires province. It harbors 18 species of Scolopacidae (Torres & Michelutti 2007), 17 of them with breeding areas in North America (Piersma & Bonan 2017). Thus, the majority of these species occur from December to March at this wintering ground (only *Calidris bairdii*, *Tringa melanoleuca* and *Tringa flavipes* are present in low abundance during winter; Acosta *et al.* 2006). This lake is one of the largest inland saline wetlands in South America and worldwide, with *c.* 2000 km^2 (Bucher & Herrera 1981). Currently, many wetlands are experiencing an alarming process of disappearance and degradation around the globe. However, Mar Chiquita Salt Lake still conserves its physiognomy, characterized by a high heterogeneity of landscapes and fluctuating hydroperiod (Bucher 2006, Troin *et al.* 2016). Regarding the aquatic bird diversity, 142 species occur in this wetland (Torres & Michelutti 2007). A total of 42 migratory species are present in the area, 30 from northern hemisphere and 12 from southern areas in Patagonia and the Andean region. Many of these species mainly use the Argentina's marine coasts and Mar Chiquita Salt Lake as feeding and wintering areas. In this salt lake, sandpipers (Charadriidae and Scolopacidae) represent the most important group of migratory birds regarding their abundance, with some species such as *Phalaropus tricolor* forming flocks of hundreds of thousands birds (Torres & Michelutti 2007).

During 2013 and 2015 we visited trimonthly the southern coasts of Mar Chiquita Salt Lake near to the river mouth of Río Primero (30°54'44.70''S; 62°51'56.91''W). Along these prospections, we focused our observations on shorebirds and other aquatic birds. On 17 October 2013, we photographed a Curlew Sandpiper individual feeding at Río (River) Primero mouth (in the place called Bahía de Mare; 30°48'23.7''S; 62°52'48.4''W; Figs. 1 & 2). The bird was observed with other sandpiper species (*C. bairdii*, *P. tricolor*, *T. flavipes* and *T. melanoleuca*). The Curlew Sandpiper looks similar to the Stilt Sandpiper (*Calidris himantopus*), a common bird in this wetland. Both species have long and curved beak and alike size. These sandpipers differ, among other features, mainly in the color of the legs, being black in Curlew Sandpiper and yellowish-green in Stilt Sandpiper (Fig. 2, Hayman *et al.* 1986). Another characteristic supporting the final identification was some reddish feathers appearing in the abdomen (Fig. 2).

This record of Curlew Sandpiper adds a new species to Mar Chiquita Salt Lake and confirms its presence in Argentina. Additionally, some authors suggest that the records of Curlew Sandpiper in the Atlantic and Pacific coasts of South America might have been of vagrant or pseudo-vagrant individuals far from their regular south bound migration, along the Palearctic-Afrotropical Flyway and West-Pacific Flyway. Musher *et al.* (2016), for example, proposed that birds recorded at northeastern Brazil could have displaced from their migration routes through Europe to west Africa. These authors suggest that this hypothesis would be supported by the regularity of Curlew Sandpipers in Barbados, where a bird was recorded 14 days after had been banded in Belgium (Hayman *et al.* 1986). Contrary to what was proposed by Musher *et al.* (2016), we suspect that the individual reported here came from the Pacific coast, where this species is a regular visitor (considering the Andes would

Figure 2. Curlew Sandpiper (*Calidris ferruginea*) recorded at Bahía de Mare (Río Primero mouth), in Mar Chiquita Lake, 17 October 2013. Note the curve bill, black legs and reddish feathers in the abdomen. Photo author: M. Toledo.

not be a barrier for the Curlew Sandpiper movements; Graves & Plenge 1978, Ridgely & Greenfield 2001). Alternatively, this bird could have come from the West-Pacific Flyway, through Australia, along the westerlies. In addition, the nearest record of Curlew Sandpipers was made at the Lluta River in Chile's north Pacific coast (Medrano & Vielma 2016), 1500 km northwest from Mar Chiquita Salt Lake.

The long coastal area of Mar Chiquita has high availability of feeding areas for different species of sandpipers. The large numbers of some sandpiper species are an indication of the feeding opportunities provided at this lake. That being so, the new record reported here for Mar Chiquita enhances the importance of this unique saline wetland not only for the extremely abundant sandpipers that use the salt lake, as well as for vagrant species arriving in central Argentina. Finally, here we connect the Mar Chiquita Lake with the West-Pacific Flyway of the Curlew Sandpiper resulting in a new hypothetical vagrant pathway.

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Articles

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Santos M.P.D. & Vasconcelos M.F. 2007. Range extension for Kaempfer's Woodpecker *Celeus obrieni* in Brazil, with the first male specimen. *Bulletin of the British Ornithologists' Club* 127: 249–252.

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