

FIRST RECORD OF PARASITISM OF SCARLET-HEADED BLACKBIRD (*AMBLYRAMPHUS HOLOSERICEUS*) BY THE SPECIALIZED SCREAMING COWBIRD (*MOLOTHRUS RUFOAXILLARIS*)

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ABSTRACT.- Screaming Cowbird (*Molothrus rufoaxillaris*) is highly specialized parasitizing only three species, making records of new hosts very informative. During 2017 we studied nesting success on roadsides in Argentine Pampas. Fifty-seven nests (46%) belonged to the known host Brown-and-yellow Marshbirds (*Pseudoleistes virescens*). Four nests belonged to Scarlet-headed Blackbird (*Amblyramphus holosericeus*); one contained a Screaming Cowbird nestling that fledged with two of the host. We discuss similarities and differences among the Scarlet-headed Blackbird and old hosts. More studies are needed to confirm the regular parasitism of Scarlet-headed Blackbird by Screaming Cowbird, and to better understand their high specificity in host selection.

KEY WORDS: *Amblyramphus holosericeus*, brood parasitism, cooperative breeding, *Molothrus rufoaxillaris*, Quiscalines.

RESUMEN.- PRIMER REGISTRO DE PARASITISMO DEL FEDERAL (*AMBLYRAMPHUS HOLOSERICEUS*) POR PARTE DEL ESPECIALISTA TORDO PICO CORTO (*MOLOTHRUS RUFOAXILLARIS*). El Tordo Pico Corto (*Molothrus rufoaxillaris*) es altamente especialista parasitando solo a tres especies de aves, lo que hace que registros de nuevos hospedadores sean muy informativos. Durante 2017 estudiamos el éxito de nidificación en bordes de camino en la región Pampeana de Argentina. Cincuenta y siete nidos (46%) pertenecieron al hospedador ya conocido Pecho Amarillo (*Pseudoleistes virescens*). Cuatro nidos pertenecieron al Federal (*Amblyramphus holosericeus*); uno contenía un pichón de Tordo Pico Corto que abandonó el nido como volantón junto con dos pichones del hospedador. Discutimos similitudes y diferencias entre el Federal y viejos hospedadores. Mayores estudios son necesarios para confirmar el parasitismo regular del Federal por parte del Tordo Pico Corto, y para comprender mejor su alta especificidad en la selección de hospedadores.

Received 10 July 2021, accepted 31 August 2021

In interspecific avian brood parasitism females lay their eggs in nests of other species- the host- who incubates parasitic eggs and provide parental care to parasite chicks. Parasitic cowbirds include five species that exploit hosts in different manners: two species are characterized by being highly generalist parasitizing more than 200 species, Shiny Cowbird (*Molothrus bonariensis*) with 270 recorded hosts, and Brown-headed Cowbird (*M. ater*) with 249 recorded hosts (Lowther 2018). On the other extreme, Screaming Cowbird (*M. rufoaxillaris*) is the most specialist one, parasitizing mainly Greyish Baywings (*Agelaioides badius*) in most parts of its distribution range with a frequency of parasitism higher than 80% (Hudson 1874, Fraga 1986, De Mársico and Reboreda 2008). However, in the last forty years it was found that two other effective hosts ("secondary hosts") are regularly parasitized by Screaming Cowbird: Chopi Blackbird (*Gnorimopsar chopi*), with frequency of parasitism of

46%, and Brown-and-yellow Marshbird (*Pseudoleistes virescens*) with frequency of parasitism of 5-20% (Sick 1985, Fraga 1996, 2008a, Mermoz and Reboreda 1996, Mermoz and Fernández 2003, Di Giacomo and Reboreda 2015). The reproductive system of all three effective hosts of Screaming Cowbird includes helpers-at-the nest that deliver food to nestlings and fledglings (Orians et al. 1977, Fraga 1991, 2008a). In addition, Screaming Cowbird is sympatric with Shiny Cowbird through all its range (Jaramillo and Burke 1999). Therefore, it has been proposed that in species whose nests are attended by only two adults, food may not be sufficient and the chicks of Screaming Cowbirds would be outcompeted by the chicks of the host or by the more aggressive chicks of Shiny Cowbirds (Fraga 1996, 2008a, Mermoz and Fernández 2003, De Mársico and Reboreda 2008, De Mársico et al. 2010, Di Giacomo and Reboreda 2015).

Here we report the parasitism and rearing of a Screaming Cowbird fledgling by Scarlet-headed Blackbird (*Amblyramphus holosericeus*), an Icterid that breeds in pairs. During this finding, individuals of two Screaming Cowbird's known hosts, the Greyish Baywing and the Brown-and-yellow Marshbird, were also present in the study area.

METHODS

As a part of a study on the importance of roadsides borders of the Argentine Flooding Pampas for breeding birds, we searched and monitored nests from mid-September to mid-December 2017 in roadsides located near General Madariaga city (3700 'S, 57°08 'W), Buenos Aires province. The climate of this region is temperate humid with mean temperature ranging from 13°C in July to 23°C in January, and the mean annual precipitation is of 1000 mm (Soriano et al. 1992). The area exhibits subtle topographic variations, with lowlands remaining flooded for long periods of time. Vegetation is a mosaic of extensive grasslands disrupted by wetlands with a high presence of Bulrush (*Schoenoplectus californicus*) and cattails *Typha* spp. and, to a lesser extent, Waxyleaf Nightshade (*Solanum glaucophyllum*). In the higher areas (mostly between 4 and 10 masl), there are small patches of native woodlands comprised mostly of Tala (*Celtis ehrenbergiana*) tree (Vervoorst 1967). About 70% of the area is used for extensive cattle rearing, with crops (maize, sunflower, soy) covering 20% (Baldi and Paruelo 2008, Lara and Gandini 2014). Most of remaining areas are covered by lagoons and deep marshes.

All nests found in studied roadsides were georeferenced and marked inconspicuously with a small flag put more than 10 m away. Most nests (except those of Scarlet-headed Blackbirds, see below) were checked every 2-4 days until nestlings fledged or the nest failed. Scarlet-headed Blackbirds adults and fledglings are sometimes illegally captured to be sold as cage-birds, and nests located in roadside borders are particularly vulnerable. Therefore, we were very careful and checked Scarlet-headed Blackbird nests more sporadically than nests of other species. Consequently, except near important dates (i.e. expected date of hatchling or fledgling), most nests checks were done with binoculars from a car parked approximately 50 m from focal nests. As Scarlet-headed Blackbird's parents present high levels of nest attention throughout their nesting cycle (Fernández and Mermoz 2000, Fernández et al. 2007), we considered that a

nest was still active when we saw one or two adults within 20 m from it.

RESULTS

We found 123 nests belonging to 17 bird species. Fifty-seven nests were of Brown-and-yellow Marshbird, 28 of them being parasitized by Shiny Cowbirds, and four by both Screaming and Shiny Cowbirds. Six were close nest of Freckle-breasted Thornbird (*Phacelodomus striaticollis*), Rufous Hornero (*Furnarius rufus*), or Great Kiskadee (*Pitangus sulphuratus*), and might be re-used as nesting sites by Greyish Baywings. However, none of these nests were occupied by Greyish Baywings probably because in the Flooding Pampas this host starts breeding later (De Mársico and Reboresda 2008, Ursino et al. 2020). Four nests were of Scarlet-headed Blackbird (*A. holosericeus*). Unexpectedly, one of the Scarlet-headed Blackbirds nests found on 6 December 2017 in a dense marsh of *Typha* spp, was parasitized by a Screaming Cowbird. Like most Scarlet-headed Blackbird nests, it was a large open-cup built with fibers of *Typha* spp. and attached to various *Solanum glaucophyllum* stems (Mermoz and Fernández 1999, Fernández and Mermoz 2000, Fernández et al. 2007). The height above the marsh bottom was 1.7 m; 1 m over water level. The nest contained one recently hatched Scarlet-headed Blackbird hatchling (as its down was still humid), one Scarlet-headed Blackbird egg, and one nestling of approximately 1-2 days of age. The older hatchling had sparse tufts of pale, grey down on a yellowish skin with white oral flanges just like Shiny Cowbird hatchlings usually look like (they may have either yellow or white oral flanges, Fraga 1978). In contrast, Scarlet-headed Blackbird hatchlings have blackish down and their skin is noticeable red (Mermoz and Fernández 1999). Since Scarlet-headed Blackbirds are parasitized by Shiny Cowbirds at a low frequency (14-15 %; Mermoz and Fernández 1999, Fernández and Mermoz. 2000), we first assumed that the older nestling was a Shiny Cowbird. The second nest-check on 13 December 2017 was very fast as we had detected potential bird captors within nest surroundings. We decided to check nest content, although ambient light levels were low. We saw one Cowbird nestling of approximately 8 days of age, and two Scarlet-headed Blackbird nestlings of 7 and 6 days of age but, to conduct the checking quickly, we decided not to handle any nestling. The third nest check on 18 December 2017 near the expected fledgling date, we found that the Cowbird nestling was not a Shiny but a Screaming Cowbird: it was comple-

tely feathered with the characteristic rufous wings and overall brownish rufous plumage (Fraga 1979, Ursino et al. 2012). In fact, the white oral flanges that it exhibited in the first nest visit, have been also described for Screaming Cowbird hatchlings (unlike the Shiny Cowbird, Screaming Cowbirds hatchlings only have white flanges; Fraga [1979]). This nestling was standing on the nest rim and fledged when we tried to approach the nest. Therefore, no images could be recorded. In addition, the nest contained two Scarlet-headed Blackbird nestlings that were completely feathered in black but were still inside the nest cup. Those Scarlet-headed Blackbird nestlings also fledged successfully three days later. Once the Screaming Cowbird fledgling left the nest, it was impossible to follow it in the dense marsh. We did not visit nest surrounding after all nestlings fledged to prevent Scarlet-headed blackbird adults and fledglings from being illegally captured.

DISCUSSION

Parasitism of Scarlet-headed Blackbird by the Screaming Cowbird might be favored by many characteristics that this host shares with Brown-and-yellow Marshbird, the secondary known host whose nests were available during our study. Both hosts feed their nestlings mostly with adult arthropods and larvae (Orians 1980). In addition, Brown-and-yellow Marshbirds also have large open nests (Fig. 1) built in a wide variety of habitats including marshes, which are the nesting habitat of Scarlet-headed Blackbirds (Gibson 1918, Orians 1980, Mermoz and Reboreda 1998). As Brown-and-yellow Marshbird and Scar-

let-headed Blackbird nests are similar in size, we consider the possibility that one Screaming Cowbird female might have confused both species and parasitized this nest by accident (recognition errors by female Screaming Cowbird). In Northeastern Argentina, this mechanism was the most likely cause for the Screaming Cowbird parasitism of two nests of species that also breed in pairs: Solitary Cacique (*Cacicus solitarius*) and Cattle Tyrant (*Machetornis rixosa*, Di Giacomo et al. 2010). However, in that case none of the four Screaming Cowbird eggs produced fledglings. Di Giacomo et al. (2010) suggested these were cases of accidental parasitism based in the fact that the Solitary Cacique's nest had been visited by Greyish Baywings who tried to usurp it unsuccessfully. In addition, the Cattle Tyrant nest was less than one meter away from a Chopi Blackbird nest, which was also parasitized by Screaming Cowbirds. In the case of parasitism of Scarlet Headed Blackbird, we did not find any known host's nest in the surroundings. The high territoriality of Scarlet Headed Blackbirds with aggressive defense of nest surrounding against conspecifics and birds of other species supports the lack of nearby nests (Orians 1980, Mermoz and Fernández 1999).

Scarlet-headed blackbirds do not reject Shiny Cowbird eggs, hence it was suggested that it is their unspecific nest defense which causes the low frequency of parasitism by the Shiny Cowbird (Mermoz and Fernández 1999). Our finding implies that one Screaming Cowbird female was able to evade the nest defense of Scarlet-headed Blackbirds. In addition, the early hatching of this Screaming Cowbird nestling indicates that the mother could synchronize parasitism with host egg laying. This early hatching probably fa-



Figure 1. Similarity between open nests of the known host Brown-and-yellow Marshbird (left), and the new host Scarlet-headed Blackbird (right). Although both hosts differed in the color and spotting pattern of eggs, sizes of nests are similar. In this case, Brown-and-yellow Marshbird nest was built mostly with grasses, but they can also use cattails (*Typha* spp.) like Scarlet-headed Blackbird do, when they build them in marshes.

cilitated that the Screaming Cowbird nestling fledged with the two nestlings of the host.

The most accepted hypothesis to explain host recognition by brood parasites is that females imprint on their foster parents and search for nests of the same species (Slagsvold and Hansen 2001). The first step for acquisition of new hosts implies that the females make a mistake and parasitize another species. If the new host successfully rears parasitic females, these females would preferentially parasitize nests of this new host (De Mársico et al. 2010). It has been proposed that Screaming Cowbird eggs or chicks would have some type of restrictive requirements to be successful. Therefore, Screaming Cowbird females that make a mistake, would be negatively selected and imprinting in foster hosts would be strengthened (Ellison et al. 2006, De Mársico et al. 2010). In contrast, eggs and chicks of generalist cowbirds like Shiny Cowbird are successfully reared by more than 90 hosts (Lowther 2018). Shiny Cowbird females that make a mistake would be positively selected, and imprinting in foster parents would be weaker (De Mársico et al. 2010). This mechanism would facilitate the invasion of Shiny Cowbird to new areas such as Antilles or South America that became favorable due to human activities (Cruz et al. 1985, Post et al. 1990, Jaramillo and Burke 1999, Lowther 2011, 2018, Mermoz et al. 2020). In contrast, the Screaming Cowbird is expanding only to deforested areas of South Western Brazil and neighbor Argentina (Sick 1985, Fraga 1996). In invaded areas, the Screaming Cowbird still parasitizes one of its known hosts within its original distribution range: Chopi Blackbird (Sick 1985, Fraga 1996, Di Giacomo and Reboresda 2015), and therefore the acquisition of a new host may not be necessary. However, recently Barros (2015) found that the Screaming Cowbird has invaded and established in deforested areas of central Chile. Apparently, it is parasitizing a new host with helpers-at-the nest (Orians et al. 1977), the Austral Blackbird (*Curaeus curaeus*), since all reports are based on Screaming Cowbird fledglings being defended and fed by them. Austral Blackbird inhabits open forests, bushy areas, and gardens that are more similar to those of Greyish Baywings, but its nest is an open cup (Jaramillo and Burke 1999).

Similar to the case reported in Chile, the Scarlet-headed Blackbird parasitism would be the first step for a new host acquisition. However, contrary to the other four species of successful hosts of Screaming Cowbirds, Scarlet-headed Blackbirds do not

have helpers-at-the nest (Hudson 1920, Orians 1980, Mermoz and Fernández 1999, Fernández and Mermoz 2000, Fernández et al. 2007). This was confirmed in the four Scarlet-headed Blackbirds nests we found, as all of them (parasitized or not) were attended by two adults. It is important to point out that based on molecular phylogenies, the five species of hosts are part of a monophyletic group of South American Quiscalines, with the two most recent reported hosts, Scarlet-headed and Austral Blackbird, being sister species (Johnson and Lanyon 1999, Powel et al. 2014). Furthermore, it has been suggested that cooperative breeding may be the ancestral mode of parental care in South American Quiscalines (Fraga 2008b), and probably of the ancestor of both Austral and Scarlet-headed Blackbirds. In addition, common ancestry suggests that both species might share some characteristic other than nesting habitat, that might be used by Screaming Cowbirds as a cue for selecting new hosts. However, further studies are necessary to confirm the regular parasitism of Scarlet-headed Blackbirds by Screaming Cowbirds.

ACKNOWLEDGMENTS

We want to thank Cynthia Ursino and three anonymous reviewers for their constructive comments on an earlier version of the manuscript. Field work was supported by Neotropical Grassland Conservancy Equipment and Student Grants to D.M.D. M.E.M. is a Research Fellow of Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET). D.M.D. was supported by a Doctoral Fellowship from CONICET. Authors have no conflicts of interest to disclose.

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