

Brood parasitism of White-rumped Swallows by Shiny Cowbirds

Viviana Massoni^{1,3}, David W. Winkler² and Juan C. Reboreda¹

¹ Departamento de Ecología, Genética y Evolución, Facultad de Ciencias Exactas y Naturales, Universidad de Buenos Aires, Pabellón II, Ciudad Universitaria, C 1428 EHA, Buenos Aires, Argentina

² Department of Ecology and Evolutionary Biology, Cornell University, Ithaca, New York 14853 USA

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ABSTRACT. Swallows and martins are infrequent hosts of the generalist brood parasite Shiny Cowbird (*Molothrus bonariensis*). We monitored 50 nesting attempts by White-rumped Swallows (*Tachycineta leucorrhoa*) over a two-year period in Argentina and detected low rates of brood parasitism (three nests, or 6%). Of the three nests parasitized, cowbirds ($N = 1$ per nest) successfully fledged from two. Eight of 13 swallow eggs in these three nests were punctured by cowbirds, and all but one swallow nesting starved at the two parasitized nests. At least two factors may contribute to the low frequency of parasitism of White-rumped Swallows by Shiny Cowbirds, including the inability of the larger cowbirds to enter some nest cavities and the aggressive nest defense behavior of adult swallows.

SINOPSIS. Parasitismo de cría del Tordo Renegrido sobre la Golondrina Ceja Blanca

Las golondrinas son hospedadores infrecuentes del Tordo Renegrido (*Molothrus bonariensis*), un parásito de cría generalista. A lo largo de dos años supervisamos 50 intentos de nidificación de la Golondrina Ceja Blanca (*Tachycineta leucorrhoa*) y detectamos una baja frecuencia de parasitismo (tres nidos, o el 6%). Los tordos ($N = 1$ por nido) abandonaron con éxito dos de estos tres nidos. Ocho de los 13 huevos de golondrina presentes en los nidos parasitados fueron picados por los tordos y todos los pichones de golondrina, excepto uno, murieron de inanición. Al menos dos factores pueden contribuir a la baja frecuencia de parasitismo del Tordo Renegrido sobre la Golondrina Ceja Blanca, incluyendo la imposibilidad del parásito de entrar en algunas cavidades pequeñas y el comportamiento agresivo de defensa que realizan los adultos del hospedador.

Key words: brood parasitism, *Molothrus bonariensis*, Shiny Cowbird, *Tachycineta leucorrhoa*, White-rumped Swallow

The Shiny Cowbird (*Molothrus bonariensis*) is a generalist brood parasite whose eggs have been found in the nests of 232 host species, with 68 of those species capable of raising a young cowbird (Ortega 1998; Lowther and Post 1999; Fraga 2002). For several species, however, records of parasitism are rare. For example, there are only three records of the eggs of Shiny Cowbirds in the nests of swallows (Holtz 1870; Mason 1986a; De la Peña 1995). In addition, Mason (1986b) reported White-rumped Swallows (*Tachycineta leucorrhoa*) feeding cowbird fledglings, and Banch (1985) photographed one of these swallows feeding a fledgling cowbird. Because Shiny Cowbirds parasitize other cavity-nesting species (Mason 1985; Mason 1986b; Reboreda et al. 2003) and the insectivorous diet of swallows is suitable for young cowbirds (Mason 1986b), the infrequent para-

sitism of swallows by cowbirds is puzzling. We examined the occurrence of parasitism of White-rumped Swallows by Shiny Cowbirds, report observations of successful parasitism of this host, and describe the behavior of one young cowbird after fledging from a swallow nest.

METHODS

From 15 September 2002 to 15 January 2003 and 15 September 2003 to 15 January 2004, we studied White-rumped Swallows in Chascomús, Buenos Aires Province, Argentina (35°34'S, 58°01'W). We monitored 53 (2002–2003) and 65 (2003–2004) nest boxes in a flat, farming landscape at the Instituto Tecnológico de Chascomús, CONICET. The boxes were checked every other day to follow the progress of nest building and egg laying, and to check for cowbird eggs. We also noted the presence of any punctured swallow eggs. We distinguished between punctures apparently made by cowbirds

³ Corresponding author. Email: massoni@ege.fcen.uba.ar

(one large, usually triangular, hole; Peer and Sealy 1999; Nakamura and Cruz 2000) from the small punctures traversing the eggshell apparently made by Southern House Wrens (*Troglodytes musculus*; V. Massoni, pers. obs.). In addition, Saffron Finches (*Sicalis flaveola*) occasionally punctured entire swallow clutches. After hatching, we weighed swallow and cowbird nestlings using spring scales.

At one nest with a fledgling cowbird perching on top of the nest box and a single nestling swallow in the box, we recorded the provisioning behavior of the adult swallows using a camcorder (Sony Hi8 XR CCD-TR 940; Sony Corporation, Tokyo, Japan). We subsequently viewed tapes to determine the number of times the young cowbird and swallow nestling were fed. All values are reported as means \pm 1 SE.

RESULTS

Over the two years of our study, nine of the 50 nests (18%) of White-rumped Swallows had at least one egg punctured by cowbirds, and three of the 50 nests (6%) were parasitized. Each parasitized nest had one Shiny Cowbird egg (spotted-egg morph; Hudson 1874; Friedmann 1929). During the same period, 10 of 19 nests (53%) of Southern House Wrens nesting in adjacent boxes were punctured and parasitized by Shiny Cowbirds. Young cowbirds fledged from all wren nests except one that was deserted after eggs were punctured and a second parasitic egg was laid.

Eggs at six swallow nests were punctured by cowbirds during egg laying and, at three of those nests, a cowbird egg was present the next time we visited the nest. At another swallow nest, an egg punctured by a cowbird was first noted on the tenth day of incubation and this nest was not subsequently parasitized. In two other nests, we could not determine the date when the eggs were punctured, but these nests were not subsequently parasitized.

Two swallow nests were parasitized on the day the last host egg was laid, and a third nest was parasitized the day after the last host egg was laid. One swallow egg was missing from each of the three parasitized nests. In addition, at two of these nests, another host egg had been punctured. At the other nest, all host eggs had been punctured and this nest was subsequently abandoned by the swallows. Thus, overall, eight

of 13 eggs (61.5%) in these three nests were punctured by cowbirds.

At both parasitized nests where swallows continued to incubate, cowbird eggs hatched after 12 d. At one nest, the 4-day-old cowbird weighed 20 g when the first swallow (2 g) hatched. A second swallow egg hatched the next day. Six days later, both swallow nestlings were found dead, and the 11-day-old cowbird weighed 36 g. The cowbird fledged 13 d after hatching and was not observed again.

At the second parasitized nest, the cowbird was 3 d old and weighed 13 g when two swallow eggs hatched. One young swallow fledged 11 d after hatching, and weighed 22 g (a typical weight at fledging; V. Massoni, unpubl. data). The young cowbird fledged 15 d after hatching and weighed 46 g. The other swallow nestling survived until 21 d post-hatching, but weighed only 15 g and apparently died of starvation. This nestling was rarely fed by the adult swallows after the cowbird fledged. For example, 5 d after the cowbird fledged (and 4 d before the nestling died), the adult swallows made 55 visits to the nest box over a 2-h period and the cowbird, perched on top of the nest box, was fed 54 times. The young cowbird appeared to monitor the approach of adult swallows to the nest box and, facing them, hopped while incessantly and loudly begged for food. As soon as the swallow entered the box, the young cowbird followed and, after the adult swallow left, it perched in, and blocked, the entrance hole for five minutes. During this time, the cowbird was fed at the same frequency as when perched on the roof of the nest box. After the young cowbird moved back to the roof, an adult swallow tried again to enter the box. However, the cowbird was able to reach the entrance hole first and was fed by the adult swallow. The cowbird remained at the entrance for two minutes before returning to the roof.

Seven days after fledging (2 d before the nestling swallow died), the young cowbird was again observed for 2-h and, during that time, remained on top of the box for 90 min. While on the nest box roof, it was fed 42 times by the swallows and the nestling swallow in the box was never fed. Again, the cowbird harassed the swallows as described above, and followed them during short flights after which it returned to the nest box roof. Only once did the cowbird perch in the entrance hole. The cowbird

repeatedly left the nest box roof and perched in a nearby tree in response to a Chimango Caracara (*Mivalgo chimango*) flying by, but we were unable to determine if the cowbird was fed when perched in the tree. During the cowbird's absence from the box roof, the swallow nestling was fed 12 times. Although both Shiny Cowbirds (Fraga 1986) and Brown-headed Cowbirds (*Molothrus ater*; Woodward 1983) are known to perch a short distance from nests from which they fledge and beg for food, we know of no other instances of food monopolization after fledging like the one we observed.

DISCUSSION

We found that only three of 50 nests of White-rumped Swallows were parasitized by Shiny Cowbirds. Similarly, De la Peña (1996) reported no parasitism by cowbirds in 16 White-rumped Swallow nests (most in Santa Fe province; 32°57'S, 60°40'W). In contrast, Mason (1986b) found that 4 of 10 swallow nests were parasitized and suggested that White-rumped Swallows were a frequent host for Shiny Cowbirds. Mason (1986b) studied Shiny Cowbirds at Magdalena, Buenos Aires province (35°S, 57°32'W), about 100 km from our study site, and parasitism rates of White-rumped Swallows at that site may have been higher because of the greater densities of both suitable hosts and cowbirds. Chalk-browed Mockingbirds (*Mimus saturninus*) and Southern House Wrens are frequently parasitized by cowbirds at Magdalena (Reboreda et al. 2003), a wooded area where White-rumped Swallows are less abundant than at Chascomús (J. C. Reboreda, pers. obs.).

Swallows and martins are infrequent hosts of cowbirds elsewhere, and the only other species known to parasitize hirundines is the Brown-headed Cowbird (Friedmann 1929; 1963; 1971; Friedmann and Kiff 1985). Several factors may have contributed to the low frequency of parasitism of White-rumped Swallows by Shiny Cowbirds in our study and may explain, more generally, the infrequent parasitism of swallows and martins by cowbirds. One factor may be that cowbirds are unable to enter some cavities. Shiny Cowbirds are larger than White-rumped Swallows (19 cm vs. 13 cm in total length and 45–60 g vs. 22 g in mean mass; Massoni pers. obs.), suggesting that swallows can enter some cavities that cowbirds cannot. In our study, Shiny Cowbirds

were able to enter swallow nests located in old Rufous Hornero (*Furnarius rufus*) nests and were also able to enter our nest boxes (entrance holes 4 cm in diameter). The typical size of the entrances of natural cavities used by nesting White-rumped Swallows has not been reported, but clearly some cavities would not be accessible to the larger Shiny Cowbirds. Other investigators have also noted that the size of cavity entrances influences parasitism rates. For example, Kattan (1998) found that House Wren (*Troglodytes aedon*) nests parasitized by Brown-headed Cowbirds were in cavities with significantly larger entrance diameters than nests in cavities that were not parasitized. Similarly, Woodward and Woodward (1979) reported relatively high levels of parasitism of cavity-nesting Eastern Bluebirds (*Sialia sialis*) by Brown-headed Cowbirds and suggested that the large size of cavity entrances was a contributing factor.

Successful parasitism of swallows by cowbirds may also be limited by the incubating and provisioning behavior of swallows. For example, Mills (1988) suggested that the incubating and provisioning behavior of Tree Swallows might reduce the chances of successful parasitism by Brown-headed Cowbirds in Ontario (Canada). Specifically, swallows may interrupt incubation during cold weather and cowbird embryos may be less tolerant of cooling than swallow embryos. In addition, Mills (1988) suggested that adult Tree Swallows may preferentially feed their own nestlings because the gape of young cowbirds is dull compared to the bright yellow gapes of swallow nestlings. In addition, the provisioning behavior of adult swallows after fledging might affect the survival of cowbirds because Tree Swallows often exhibit variable and limited post-fledging parental care (Robertson et al. 1992).

Our results suggest that the incubating and provisioning behavior of adult White-rumped Swallows did not reduce the survival probabilities of young Shiny Cowbirds. Although average minimum temperatures during the breeding season at our study site (9°–13°C) are similar to those during the breeding season in Ontario (7°–13°C), cowbirds in our study hatched within their normal incubation period and there was no evidence that cowbird embryos suffered from incubation stress. Like young Tree Swallows, nestling White-rumped Swallows have bright yellow gapes. However, nestlings of the two species coexisted for several days and young

cowbirds were fed to the detriment of the swallow nestlings. Gape color, therefore, did not seem to be important. Finally, our observations suggest that young Shiny Cowbirds can obtain substantial parental care from White-rumped Swallows after fledging.

Even if nest entrances are large enough to permit entry by cowbirds, we suggest that vigilance at nest sites by swallows when parasitism is most likely to occur (at sunrise and early morning; Hoy and Ottow 1964; Scott 1991) is an effective defense against parasitism (Sealy et al. 1998). We did not measure nest attentiveness by swallows, but their reactions to our presence suggest they are usually near the nests. In addition, we often observed nest defense behavior by swallows directed toward conspecifics, cowbirds, and other secondary cavity nesters such as nonparasitic Bay-winged Cowbirds (*Molothrus* (= *Agelaioides*) *badius*) and Saffron Finches. Swallows defended nest cavities during the entire nesting period and, therefore, we believe that such behavior was not an antiparasitic defense *per se*, but rather a generalized behavior. However generalized, if aggressive behavior toward cowbirds occurs during the relatively short period available for successful parasitism, i.e., during the host egg-laying and early incubation period, it might contribute to the low frequency of parasitism we observed. In addition, nest boxes at our study sites were approximately 30 m apart and we usually observed communal mobbing by swallows when a pair was alarmed by a potential predator or nest usurper. Tree Swallows also defend their cavities from potential predators and engage in communal defense (Winkler 1992) but, to our knowledge, no one has examined the possible role of such behavior in reducing the frequency of parasitism by Brown-headed Cowbirds. Because our observations of nest defense by White-rumped Swallows were anecdotal, additional studies are needed to clarify the possible roles of nest attentiveness at dawn and early morning, aggressive nest defense, and egg-rejection behavior by White-rumped Swallows in limiting parasitism by Shiny Cowbirds.

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