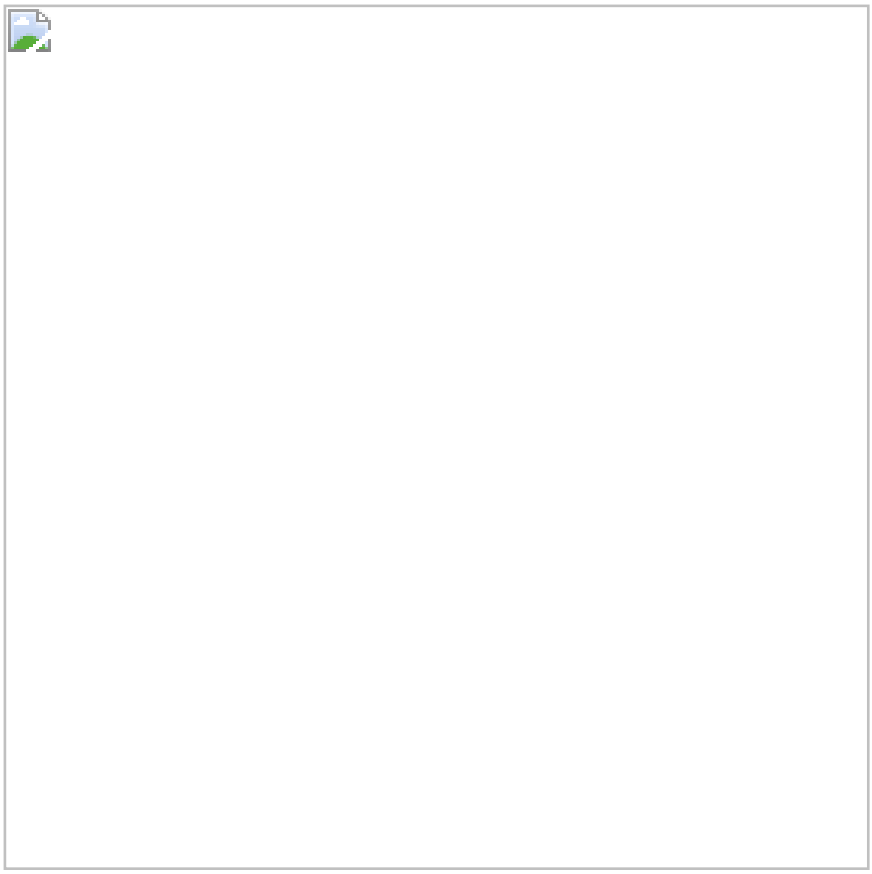

Facultative brood parasitism by an American Robin (Turdus migratorius) in the nest of a Gray Catbird (Dumetella carolinensis)

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Facultative brood parasitism by an American Robin (*Turdus migratorius*) in the nest of a Gray Catbird (*Dumetella carolinensis*)

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ABSTRACT—Avian brood parasites can be classified as either obligate or facultative. Obligate brood parasites, such as Brown-headed Cowbirds (*Molothrus ater*), must lay their eggs in the nests of other species because they exhibit no parental care. Although facultative brood parasitism, when species that would normally lay eggs in their own nests dump eggs in the nest of another individual, may occur frequently among conspecifics, facultative interspecific brood parasitism is relatively rare. Here I report on observations made during the breeding season of 2018 of an example of facultative brood parasitism by an American Robin (*Turdus migratorius*) in the nest of a Gray Catbird (*Dumetella carolinensis*). Two robin eggs were laid in the nest of the catbird and were successfully raised by the catbird to fledging age. Although the young of obligate brood parasitic cowbirds are rarely raised successfully by catbirds, this is the first documented example, of which I am aware, of a Gray Catbird successfully raising the young of a facultative brood parasite. *Received 27 August 2019. Accepted 18 February 2020.*

Key words: egg-dumping, fitness, host-parasite interaction, parasitism, parental care

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Parasitismo de puesta facultativo por un zorzal *Turdus migratorius* en el nido del maullador *Dumetella carolinensis*

RESUMEN (Spanish)—Los parásitos de puesta pueden ser clasificados como obligados o facultativos. Los parásitos de puesta obligados, como el tordo *Molothrus ater*, deben poner sus huevos en el nido de otras especies porque no tienen comportamiento parental. Aunque el parasitismo de puesta facultativo, aquel en que las especies que normalmente ponen huevos en sus propios nidos pero

expulsan los huevos de nidos ajenos para poner los suyos, puede presentarse frecuentemente entre conespecíficos, el parasitismo de puesta facultativo interespecífico es relativamente raro. Aquí reporto observaciones hechas durante la estación reproductiva de 2018 de un ejemplo de parasitismo de puesta facultativo por un zorzal *Turdus migratorius* en el nido de un maullador *Dumetella carolinensis*. Dos huevos de zorzal fueron puestos en el nido del maullador y fueron exitosamente criados por éste hasta la edad de emancipación. Aunque la progenie de los tordos, que son parásitos de puesta obligados, es raramente criada exitosamente por maulladores, este es primer caso del cual estoy enterado en que un maullador crió exitosamente los polluelos de un parasito de puesta facultativo.

Palabras clave: cuidado parental, éxito reproductivo, expulsión de huevos, interacción hospedero-parásito, parasitismo

Female birds will sometimes lay eggs in the nests of other birds (Payne 1977). In most instances, these birds are obligate brood parasites such as cowbirds and old-world cuckoos that have evolved a specific reproductive strategy that utilizes heterospecifics to raise their offspring (Davies 2000). Facultative brood parasitism (also called egg-dumping) occurs when a female of a species that typically exhibits parental care of offspring lays eggs in the nest of another individual (e.g., Bailey 1886, Gustafson 1975, Littlefield 1984, Sealy 1989). Facultative brood parasitism occurs more frequently between conspecifics than heterospecifics (Yom-Tov 2001), and has been linked to a shortage of nest sites (Barrientos et al. 2015) or as a response to disruption in the normal nest cycle of the egg-dumping female (Hamilton and Orians 1965, Wiens 1971, Shaw and Hauber 2009).

Brood parasitism can have important negative effects on the fitness of those individuals that are parasitized by reducing reproductive output (e.g., Weatherhead 1989, Payne and Payne 1998, Burhans et al. 2000). Because of this, many species that have evolved under the pressure of brood parasitism exhibit adaptive responses to reduce the frequency of being parasitized. Front-line defenses are responses by potential hosts to limit access of parasitic species to their nests such as parents mobbing parasites (Welbergen and Davies 2009). If parasites can gain access to the nest and lay their eggs, hosts can rely on egg-stage defenses such as recognition of parasite eggs (Rothstein 1975a) and either rejection (Davies and Brooke 1988) or renesting (Hosoi and Rothstein 2000) when parasite eggs appear in the host nest. Finally, hosts have evolved mechanisms to minimize fitness consequences of successfully hatched parasites by either evicting parasite nestlings (Sato et al. 2010) or neglecting to feed parasite nestlings or fledglings (Schuetz 2005, Grim 2006).

Gray Catbirds (*Dumetella carolinensis*) are common shrub nesting species across much of North America (Smith et al. 2011). In a population in Ontario, approximately half of all catbird nests were found to be parasitized by Brown-headed Cowbirds (*Molothrus ater*; Scott 1977). However, because they are known ejectors of cowbird eggs, the fitness effects of cowbird parasitism on catbirds appear to be relatively minimal (Lorenzana and Sealy 2001). Facultative brood parasitism by other species on catbirds has only been documented a handful of times, and almost always results in the failure of parasite offspring to be raised (e.g., Holcomb 1967). Here, I document observations made during June 2018 of a catbird nest that was first found with 2 American Robin (*Turdus migratorius*) eggs that were subsequently incubated to hatching and appeared to be successfully raised to fledging.

Methods

I studied a population of Gray Catbirds on and around the Pennsylvania State University Schuylkill campus at 150 m a.s.l. (40.64°N, 76.17°W) from 2016 to 2019. My study site, located north of the borough of Schuylkill Haven, Pennsylvania, consisted mostly of second growth forest with a dense understory of woody shrubs. The observations described below were made in 2018 as part of an ongoing study that focused on several aspects of the biology of catbirds. Nest-searching began in mid-May of all years and continued through early August in order to find as many catbird nests as possible (~100 nests/year). Once found, nests were checked every 3–4 d to determine outcome. Adults were captured with mist nets throughout the season and banded with a unique combination of 1 aluminum and 3 colored, plastic leg bands. By the end of a typical year, ~75% of breeding adults are banded on the study site.

Results

On 6 June 2018, while searching for catbird nests near the Penn State Schuylkill Physical Plant

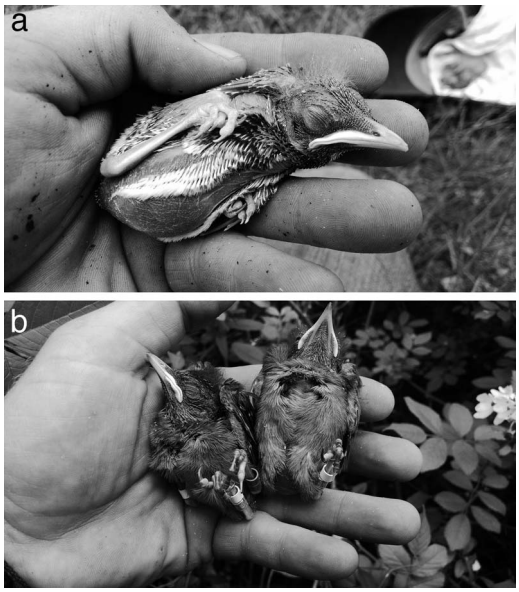

Figure 1. (a) One of the two nestling American Robins that hatched from the eggs that were laid in a Gray Catbird nest near Schuylkill Haven, Pennsylvania. Photo taken on 18 June 2018. (b) 10-day-old Gray Catbird nestlings from this study site for comparison.

building along University Drive, I located what, at first, I thought was a catbird nest containing 2 eggs. The nest was placed ~1.5 m above the ground in the crown of a Tatarian honeysuckle (*Lonicera tatarica*) growing on a sloped bank above the shoulder of the road. An unbanded female catbird flushed from the nest when I approached and found 2 eggs in the nest. I removed the eggs to measure length and breadth and noticed they were much paler blue than typical catbird eggs. The measurements of these eggs (length = 27.6 and 26.4 mm, breadth = 18.9 and 19.3 mm, respectively) were much larger than catbird eggs on my study site (mean ± SD length = 23.36 ± 1.074 mm, mean ± SD breadth = 17.29 ± 0.500 mm, $n = 415$). On 11 June 2018, I carefully approached the nest and was able to confirm that a female catbird was, indeed, incubating, and that the nest contained the same 2 eggs that were present 5 d earlier. By 15 June 2018, the eggs had hatched as the nest contained 2 nestlings that weighed 21.75 and 16.0 g. An adult catbird also aggressively responded to my presence by giving both "mew" and "quirt" calls (Smith et al. 2011) and remained within the bush while I measured the nestlings. While checking the nest on 18 June 2018 no adults were present, but the nest still contained the 2 nestlings, which were now beginning to take on the appearance of immature American Robins (Fig. 1). My last visit to the nest was 22 June 2018 and I observed 2 relatively large nestlings that appeared very close to leaving the nest. An adult catbird was also present and responded aggressively to my presence.

Discussion

Gray Catbirds usually respond to nest parasitism by quickly ejecting more than 90% of parasite and artificial eggs (Rothstein 1975b). The ability to recognize and eject heterospecific eggs by catbirds appears to be a learned behavior, perhaps established during the first reproductive bout of a female when she imprints on the first or first few eggs laid thereby rejecting any other eggs that do not match the first egg laid (Strausberger and Rothstein 2009). However, if another species lays an egg in the nest prior to clutch initiation, a female catbird may reject her own eggs and incubate the non-catbird eggs (Rothstein 1974). Timing of laying between the parasite and catbird host, then, must occur in such a way that the parasite eggs appear shortly before the catbird lays so that the parasite eggs are incorrectly learned as those of the catbird, and, thus, the eggs laid by the catbird are ejected from the nest and she will incubate the egg or eggs of the parasite.

American Robins have been observed laying eggs in the nests of other species (Howell 1942), however, these eggs are rarely successfully raised. I suggest that in the case documented here, a female robin found the catbird nest and laid at least one egg prior to when the female catbird initiated laying its clutch. Because this was the first egg laid in the nest and most likely the first nest of the season for this particular female because of the relatively early date, the catbird imprinted on the robin's egg and when the catbird began to lay eggs of its own, they were mistakenly recognized as being foreign and were subsequently removed from the nest. This would explain why there were no catbird eggs found in the nest. Alternatively, the robin could have removed the catbird eggs while laying its eggs because catbirds have been shown

to accept bluish eggs similar in color to those of robins (Rothstein 1982). Either way, the female catbird then proceeded to incubate and, following hatching, was apparently able to provision the robin nestlings appropriately as evidenced by the fact they appeared to follow a normal developmental trajectory. This is possible because the diets of nestling American Robins (Howell 1942) and Gray Catbirds (Gross 1948) appear to overlap as they both include substantial amounts of soft-bodied invertebrates. Given that the nest hatched sometime between 11 and 15 June, the nestling robins on 22 June were 8–11 d old. Taking into account the mass of the nestlings recorded on 15 June and using ranges of nestling mass given by Howell (1942), the nestling robins were 2–4 d old indicating on 22 June they were 9–11 d old, which is old enough for young robins to fledge (Howell 1942), indicating that the female catbird was able to successfully raise the young robins. To my knowledge, outside of Brown-headed Cowbirds (Smith et al. 2011) this is the first example of a catbird successfully raising young resulting from brood parasitism.

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