

FREQUENCY OF NEST VISITS BY NON-RESIDENT HATCH-YEAR TREE SWALLOWS

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Introduction

Stiles and Taylor report on a number of instances of recently fledged tree swallows (*Tachycineta bicolor*) being detected visiting nest boxes from which they did not originate.¹ Such encounters with “non-resident” hatch-year (HY) swallows appear to be rare, but it is unclear how often such visits actually occur. The account by Stiles and Taylor¹ prompted me to examine my own records of the nesting biology of tree swallows, as well as review some of the literature, to gain further insight into the frequency of occurrence and some of the potential explanations for this phenomenon.

Study Area and Methods

I have been intensively studying tree swallows breeding in nest boxes on 3 separate study areas in the vicinity of Prince George BC (53° N, 122° W) since 2001. The Dykes area (“D”) is located approximately 20 km south of Prince George and has been

monitored since 2001, with the number of boxes ranging from 104 – 197 over these years. Occupancy has averaged 48.2%. The Stewards area (“S”) is 20 km west of Prince George, and has been active since 2002, with the number of boxes ranging from 139 – 169 and occupancy averaging 46.4%. The Western (“W”) area was established in 2008, with boxes numbers ranging between 55 – 60 and an occupancy rate of 74.9%. The Western area is approximately 10km west of Prince George.

Each study site consisted mainly of pasture and hayfields with a number of small wetlands, surrounded by second-growth forest of various ages. Nest boxes on each site were ~30 m apart and mounted either on wooden or metal fence posts in a linear fashion along roads, trails, and fence lines. Tree swallows arrived on sites in late April or early May and began laying eggs in mid- to late-May. We visited nest boxes

every other day beginning in mid-May, keeping track of the nest building progress until the first egg was laid. From then on all nests were visited daily until laying was complete, and we recorded the clutch initiation date and clutch size. Nests were then not visited again until several days before the predicted hatching date, and we subsequently documented the actual date of hatching and number of eggs hatched. In general, individual nestlings were uniquely marked with non-toxic markers beginning at 4 days of age, and banded with aluminum bands at 16 days of age. Measurements of mass and length of the combined head and bill were recorded for each nestling every other day from 4 to 16 days old. Additionally, the length of the ninth primary flight feather was measured every other day when nestlings were 8 to 16 days old. Over the course of 13 years, my students and I have made 10,238 visits to nest boxes to measure offspring growth. Nests were not visited again until 22 days post-hatch to determine fledging success.

Results

Encounters With Live Birds:

On 28 July 2001, an unbanded HY tree swallow was found in box 8-D at 09:42 h and banded (3111-57942). The box contained

four resident nestlings that were 12 days old. In 2004, a nestling hatched on 11 June in box 345-D, and was last measured and banded (1851-05862) on 27 June when 16 days old. On 4 July 2004 at 10:01 h it was found in box 16-D, a distance of 890m away, which contained six resident nestlings that were 16 days old. Then on the same day it was found in box 319-D at 13:29 h. Box 319-D contained seven resident nestlings that were 16 days old, and is 230m from box 16-D and 785m from box 345-D. Neither of the above two birds were recaptured in subsequent years. Most recently, on 10 July 2013 at 12:23 h an unbanded HY tree swallow was found in box 49-W. This nest contained a brood of five young that were 16 days old when the HY bird was detected.

Encounters With Dead Birds:

Nestling 2321-96378 was banded at 16 days of age in box 21-D on 26 June 2010. It was later found dead in box 17-D on 5 July 2010, about 80m away. At this point the resident chicks in box 17-D would have fledged within the previous 1-2 days. Nestling 1921-13125 was banded as a day 16 nestling on 2 July 2004 at box 12-S, and was later found dead 1.0km away in box 62-S on 11 July 2004, which contained four resident nestlings that were 16 days old. We banded nestling 2321-95477 at box 12-S

on 28 June 2010 when it was 16 days old. It was found dead in box 62-S on 4 July 2010. Box 62-S contained seven chicks on 4 July that were 12 days old. Nestling 2401-67881 was banded at day 16 box 3T-S on 3 July 2010. It also was found dead in box 62-S on 16 July 2010, a distance of 3.65km away. At this point the resident chicks would have fledged within the past 2-4 days. The frequency in which boxes 12-S and 62-S appear in the above observations is remarkable.

Probability of Encounter: Although we have made over 10,000 visits to nests over the past 13 years, it would not be possible to encounter non-resident HY birds visiting other nests until the first nests of the season had fledged young. Therefore, to calculate the overall probability of encountering non-resident HY birds at nests, for each year I summed the number of nest visits that we made once the first nest of the year had fledged, which usually occurs by about 22 days after hatching.² Presumably, the breeding chronology of tree swallows away from the study area, but within the vicinity of my sites, would be similar. Using this criteria, we made 3226 visits to active nests (i.e., those that still had resident nestlings present), and as indicated above, I found

non-resident HY birds in active nests a total of 6 times (3 live birds in 4 nests, 2 dead birds in 2 nests). Therefore, the overall probability of encountering a non-resident HY tree swallow in an active nest is very low at 0.00186.

Age of Residents During Visits by Non-Residents: In all cases where non-resident birds were detected in nest boxes the resident nestlings were 12 or 16 days old, or else were found dead in boxes where residents had recently fledged. While this might suggest that HY birds that visit other nests may preferentially be choosing those that contain older nestlings, it is also possible that at the point during the season when these visits occur, the only nests available are those with older nestlings. To investigate this, for each instance where a non-resident bird was detected in an active nest (i.e., not including those observations where dead birds were found in nests after the resident nestlings had fledged), I examined the distribution of ages for all nests on the study area that were active on the date the non-resident was detected, and for which we might have visited the nest (16 days old or less). For all encounters with non-resident birds, 41 out of 70 (58%) of the active nests on these days had resident nestlings between 12

and 16 days of age. Therefore, while the majority of active nests had older nestlings when non-residents visited them, there does appear to be a bias towards non-residents preferentially visiting nests with older offspring.

Discussion

My observations suggest that the overall probability of encountering a non-resident HY tree swallow in active nests is a rare event, with the probability of an encounter during a researcher or nest box monitor's visit being less than 0.2%. Such visits by non-residents obviously occur later in the breeding season when resident nestlings are relatively old, but there was some suggestion that non-residents were more likely to be visiting nests with older rather younger nestlings. Nonetheless, the apparent rarity of non-residents visiting nests may simply be a function of the fact that our visits to nest boxes account only for one moment during an entire day, and moreover that non-residents may flush from nest boxes at our approach. Indeed, when Michael Lombardo performed intensive observations (488 h) of 76 nest boxes in New Jersey, including the use of video cameras, non-resident tree swallows were seen at every nest during the brood-rearing period, making a total of 1669 visits, of which 331 were

by non-resident HY birds while the remainder were by non-resident adults.³ While others have observed non-resident tree swallows visiting nests,^{e.g., 4} I am unaware of other studies where detailed behavioural observations of this phenomenon been conducted apart from Lombardo's work.^{3,5}

Despite the lack of detailed accounts of non-resident visits to nests of tree swallows, several hypotheses have been proposed to explain this behaviour by recently fledged birds. Lombardo proposed the 'exploratory dispersal hypothesis' which suggests that visits by non-resident HY birds late in the year is a consequence of these birds searching for potential future breeding sites.⁵ Given that nest sites are often limited for tree swallows,² such exploratory behaviour would be beneficial and Lombardo suggested that individuals might visit a number of potential sites, even as they migrate south at the end of the summer.⁵ In Lombardo's study, only 3 of 218 (1.4%) of visits by non-resident HY birds were made by those that had fledged from his study area earlier in the year,⁵ and my observations and those of Stiles and Taylor¹ also suggest these visits are frequently made by birds from outside the

immediate area. Although this hypothesis has intuitive appeal, there is little evidence to support it, as none of the 45 non-resident HY birds that Lombardo banded were ever recaptured as breeders on his study area.⁵

It has also been suggested that non-resident visitors could be helpers at nests.^{3,6} Lombardo, however, found no definitive evidence that non-resident visitors ever passed food to the resident nestlings.³ Alternatively, non-resident HY visitors may be attempting to procure food from the resident parents. Christine Sheppard, who also observed non-resident HY birds in nests, hypothesized that because they were larger than the offspring in the nests they occupied, that they could outcompete them.⁴ Lombardo detailed one anecdotal observation of a non-resident HY visitor trying to steal food from the mouth of a resident chick that had just been fed, while another non-resident was observed to eat a fecal sac in the nest it had visited.³ While Lombardo never observed a non-resident bird begging for food from resident parents while inside a nest box, they did beg for food from resident adults outside of the box.³ Parents always ignored this begging, except in one case where a male resident passed food to a begging non-resident

outside the box. Non-resident HY birds were in 20 instances observed by Lombardo attempting (unsuccessfully) to steal food from parents as they were flying in the vicinity of the nest box.³ Overall, there appears to be the most support for the idea that non-resident birds visit nests of other birds in an attempt to secure food resources. The fact that both Stiles and Taylor¹ and myself have found a number of non-resident HY birds dead in nests, presumably from starvation, corroborates the notion that these birds may be having difficulty obtaining sufficient food to meet their energetic demands. Regardless, further observation and research is required to fully understand this phenomenon.

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1. Stiles D, Taylor W (2014) Newly fledged tree swallows which visited other nestboxes. *Blue Jay* 73 (3): p139
2. Winkler DW, Hallinger KK, Ardia DR, Robertson RJ, Stutchbury BJ,

Cohen RR (2011). Tree swallow (*Tachycineta bicolor*). In: Poole A. (ed) The Birds of North America Online. Ithaca: Cornell Lab of Ornithology. Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bnaproxy.birds.cornell.edu/bna/species/011>

3. Lombardo MP (1986) Attendants at tree swallow nests I. Are attendants helpers at the nest? *Condor* 88:297-303.

4. Sheppard CD (1977) Breeding in the Tree Swallow, *Iridoprocne bicolor*, and its implications for the

evolution of coloniality. Ph.D.diss. Cornell Univ., Ithaca, NY.

5. Lombardo MP (1987) Attendants at tree swallow nests II. The exploratory-dispersal hypothesis. *Condor* 89:138-149.

6. Brown JL (1978) Avian communal breeding systems. *Annual Review of Ecology and Systematics* 9:123-155.



Communal tree swallows at nest box

-Dick Stauffer