J. Field Ornithol., 61(4):426-430

METHOD FOR TRANSPLANTING NESTS OF BARN SWALLOWS

DAVID W. WINKLER AND JOHN P. MCCARTY
Division of Biological Sciences
Section of Ecology and Systematics
Cornell University
Ithaca, New York 14853 USA

Abstract.—A method is described for transplanting nests of Barn Swallows during the nestling stage by transferring them into a box that is open on one side, moving them onto the roof of a car, and driving them slowly to the transplant site. With this method, traversing a distance of 3.5 km required 27 h of daylight for one nest and 13 h for another. Chicks fledged from both transplanted nests, but only one parent remained with one of the nests following the transplant.

MÉTODO PARA TRASLADAR NIDOS DE *HIRUNDO RUSTICA*

Sinopsis.—Se describe un método para trasladar nidos de golondrina (*Hirundo rustica*) de un lugar a otro durante la etapa en que hay pichones en el nido. El nido y los pichones se transfieren a una caja abierta en uno de sus lados; se coloca la caja con el nido sobre la cubierta de un automóvil y se procede a mover a este a baja velocidad hasta el lugar deseado. Tomó 27 horas en una ocasión y 13 en otra para mover nidos a una distancia de 3.5 km. Los polluelos lograron volar de ambos nidos trasladados, pero tan sólo uno de los padres permaneció en uno de los nidos luego de haberse hecho el trasplante.

Members of the family Hirundinidae are increasingly popular species for research in behavior and ecology, and we here report a technique that may be of use to other students of swallows and martins. As part of a study of the foraging and breeding ecology of Barn Swallows (*Hirundo rustica*), we have been working toward cultivating a breeding population at the experimental ponds near Cornell University, Ithaca, New York. We have recently added nest platforms and two bridges over the canals at the site as nesting habitat for Barn Swallows. Hirundines tend to be traditional in their use of nesting areas (e.g., Shields et al. 1988, Snapp 1976), however, and we were pessimistic that we would be able to entice Barn Swallows to nest at the study site without the presence of some founding individuals to act as attractants, even though Barn Swallows regularly forage in small numbers at the site. Published reports (e.g., Dubois 1976, Tostain 1979) indicated that other hirundine species have successfully fed young on moving boats, and we decided to try transferring pairs of swallows to our new site.

We chose two swallow nests to be moved from a barn located 3.5 km from our study site. The first nest was located on a beam approximately 2.5 m above ground and 8 m from the nearest opening to the outside. On 21 June, this nest contained five chicks approximately four days old, and on that day we removed the nest from the beam by sawing through the mud at its base with a fine-toothed wood saw. We immediately placed the nest in a wooden box open on one side (i.e., a nest-box with one side removed and inside dimensions of 13 cm deep × 20 cm high) and hung

this box on the beam next to the original site of the nest. We left the box in this position, and on the following morning we moved the box, in a series of 2–3 m steps, to the barn opening and then out into the open air on the barn's exterior wall. All the moves to this point had been made at approximately hourly intervals after clear signs that the parents had been attending the nest in each of its new positions. Once the nest was placed on the outer wall, the swallows failed to return to the nest for fifty minutes, and we decided to return the nest to a position just inside the barn, waiting for the chicks to grow a little more and develop into a more potent begging stimulus for the parents. At this point we also placed a low (ca. 5 cm) barrier made of pegboard across the opening of the box, since the nest by this stage had collapsed and we were concerned about the possibility that some of the chicks could tumble out of the nest. (We later learned that one of the chicks disappeared from the nest and another perished at or just before this time, so future transfers of Barn Swallows should definitely include a low barrier from the start.)

We did not visit the nest again until 25 June, and on that day we again moved the nest outside the barn, beginning at 07:30 hours (all times EDT). The parents continued visiting the nest regularly, and we continued, in a series of 1–5 m moves, to move the nest 6.5 m around a corner of the barn, down its 10 m side and onto the roof of our field vehicle by 19:30. Negotiating around the corners of the barn appeared to be a particularly difficult transition for the parents, and we found it more efficient to cross these obstacles using a series of short moves (0.5 m to 1.0 m) rather than attempting longer jumps. The 4 m distance from the barn to the roof of our field vehicle was broken up into a series of 1 m steps by placing the nest on a mist-net pole, after an unsuccessful attempt to span the distance in a single move.

Once the nest was on the roof of the vehicle, we moved the vehicle about two meters by 20:00 hours. The birds continued to feed until 20:35, at which time swallows were last seen at the nest for the day. We waited until after sunset (20:47 hours), and at 21:12 moved the nest inside the field vehicle for the night to protect it from predators (especially barnyard cats).

We returned the following day at 04:58 (one-half hour before local sunrise) and replaced the nest on the field vehicle's roof, resting it upon a piece of styrofoam insulation and securing it firmly to the vehicle's luggage rack. After the parents began making feeding visits to the nest at 05:24 we began moving the nest in a series of 1 to 4 m steps reaching the road 20 m away by 06:57. The remainder of the day was spent gradually traversing the 3.5 km of road between the nest's initial site and our study area. We used the same routine that had successfully brought the swallows out of and around the barn, waiting at each new position until one or both parents fed, waiting at first for two feeding visits and working by mid-morning into moving after every feeding visit. The distance between stops was increased along the road from about 5–10 m per stop initially to about 100–200 m between stops near the end of the day.

The distance between stops that would be tolerated by the swallows appeared to be a function to some extent of the habitat being traversed. We found it necessary to shorten the distance travelled between visits to 5 m to 20 m while traversing a 0.7 km stretch of the road that is bordered on both sides by forest, as the swallows seemed reluctant to follow the vehicle into this area. During the approximately 3 hour period required to traverse this section the nest was visited by only one of the parents (believed on the basis of plumage to be the male), but as soon as we moved back into open areas the other parent returned. In open country the swallows seemed to have little trouble keeping up with the larger steps. We arrived at our destination at 19:30 and transferred the nest back to a mist-net pole for the night.

The next morning, we moved the nest toward its final destination beneath one of the bridges spanning a canal. We transferred the nest from the pole to the center of the 8 m bridge in a series of 1–2 m steps. From there, we moved the nest under the bridge in one step and finally transferred the nest lining and nestlings into an abandoned barn swallow nest that we had affixed to the bridge using mud and a welded wire support. The parents showed no difficulty in adjusting to this final move, and sporadic observation of the nest the remainder of the day indicated normal parental behavior by both parents. This transplanted pair went on to fledge the remaining three offspring.

The second nest was located on a beam 2.5 m above the ground, 3 m from the nearest opening. We color-marked both parents prior to moving them and on 30 June placed the nest in a box open on one side as described above. On the evening of 1 July, when the nest contained four chicks approximately 5 days old, the nest was moved to just inside the entrance of the barn. In this case we were able to park the field vehicle at the entrance to the barn and by 07:30 on 2 July the nest was in place on top of the vehicle. At this point, the female stopped feeding the chicks, and within three hours she was no longer approaching the nest. Because we had learned in the previous transplant that one parent can stop feeding for a time and then return later, we continued to move the nest as for the first pair while the male continued to feed the chicks alone. We were forced to limit our moves to 10 m to 20 m at a time, as attempts at longer jumps resulted in the male refusing to follow the nest. In one instance the male was absent for 90 minutes before we were forced to back-track and allow him to rediscover the nest. Our progress was slow, and we advanced only about 0.7 km by 17:00. At that time, the male suddenly began making frequent (1/minute) feeding visits and appeared to begin to identify the vehicle as the nest site. With this high and sustained visitation rate, we were able to advance a further 1.5 km by 20:08, at which time we stopped moving the truck between feeding visits to allow the male to become acquainted with the location before sunset. The male continued to feed frequently until 20:54 at which time he was last seen near the nest. At 21:15 the nest was placed inside the truck for the night and we returned the vehicle to the study area.

We returned with the vehicle and had the nest in place on the roof by 05:00 on 3 July. The male returned and began regular feeding visits at 05:21, and we began to move the truck between visits, advancing the remaining 1.2 km to the study site by 06:35. We transferred this nest to the second bridge following the same procedure as for the first transfer, and the male settled down to single-handedly raise the four chicks successfully to fledging.

In the process of transplanting these nests, we observed several aspects of behavior that may be of interest to other students of the Hirundinidae. The swallows' perceptual "map" of the nest-site seemed to shift during the course of the experiment (cf. Grzybowski 1979). During the first day and a half of the transplants, the swallows seemed to orient to the nest-site almost entirely by its location on the previous visit. When the swallows returned after a shift in nest-location to find the nest missing at the old site they would refind the nest through a series of swoops in the vicinity of the nest's previous location followed by a gradual shifting of attention to the nest at its new location, even though the nest was clearly visible only a meter or two away. This behavior was initially retained once the nest was placed on the field vehicle, and it was a curious sight to see the swallows circling over an empty area of road where the vehicle recently had been. This behavior gradually waned as the birds began to approach the vehicle after passing briefly through the area where it had recently been. By the time we had covered half the distance to the new site the swallows finally began to approach the vehicle directly without hesitating first at its previous location. By day's end, their perception of the nest-site appeared to have shifted entirely over to an association with the field vehicle and not its location. This impression was reinforced when we transferred the first nest-box to the mist-net pole at the pond's facility on the evening of 26 June. Once we had accomplished the transfer, we drove the field vehicle about 50 m away to observe the nest. Within a minute, we realized that we had made a mistake: the birds were circling the rear of the vehicle instead of their nest! We then replaced the vehicle about 2 m from the nest, and the parents "rediscovered" their nest within a few minutes. We left the vehicle in place overnight, and removing it the next morning caused no problems in nest-finding by the parents.

The transplant also yielded interesting observations on the flexibility in foraging areas used by the parents. When we began the transplant experiment, we were concerned that the swallows might have attachments to foraging areas that would prohibit them from making a move of the scale we had in mind. But we were relieved to see that the parents shifted their foraging areas readily. This became most apparent when we moved the first nest into the open area on the afternoon of 26 June, and the parents spent their time foraging within sight of the vehicle, moving their foraging area forward as the vehicle made each step forward. It should be mentioned in passing that this phase of the birds' activity made it difficult to conduct the changes in nest position as we had before: as the parents began to spend all their foraging time within sight of the vehicle,

it was no longer possible to enter and leave the vehicle undetected. As a result, we simply stayed within the field vehicle, and, by monitoring the birds' activities and presence at the nest with the vehicle's rear-view mirrors, moved the nest between parental visits.

Although we have as yet only conducted this transplant on two nests from one species, we feel that the success of the experiment should be reported, since many nests of the hirundines nesting on buildings are routinely "cleaned off," and these birds might be used instead as the founding birds of a new study population. This technique may also be useful for a broader variety of applications in behavioral and ecological studies of the Hirundinidae.

ACKNOWLEDGMENTS

We would like to thank Robert Johnson, David O'Neill, and Raymond Moranz for their assistance in the field and Richard Tiberio and Laurel Southard for allowing us to remove the birds from their barn.

LITERATURE CITED

DUBOIS, P. 1976. Hirondelle de fenetre *Delichon urbica* nichant sur un bateau. Alauda 44:335.

GRZYBOWSKI, J. A. 1979. Responses of barn swallows to eggs, young, nests and nest sites. Condor 81:236–246.

SHIELDS, W. M., J. R. COOK, M. L. HEBBLETHWAITE, AND S. S. WILES-EHMANN. 1988. Ideal free coloniality in the swallows. Pp. 189–228, *in* C. N. Slobodchikoff, ed. The ecology of social behavior. Academic Press, New York.

SNAPP, B. D. 1976. Colonial breeding in the Barn Swallow (*Hirundo rustica*) and its adaptive significance. Condor 78:471–480.

TOSTAIN, O. 1979. Nidification sur un bateau de l'Hirondelle a ailes blanches, *Tachycineta albiventer,* en Guyane Francaise. Le Gerfaut 69:393–395.

Received 25 Sep. 1989; accepted 5 Dec. 1989.