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EASTERN BLUEBIRDS PREFER BOXES CONTAINING OLD NESTS

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Abstract.—Eastern Bluebirds (*Sialia sialis*) chose boxes containing old nests in 38 of 41 instances in which these boxes were paired with empty ones. Other species nesting in bluebird boxes chose boxes containing old nests in four of five instances. This result conflicts with the prevailing opinion that cavity-nesting birds avoid boxes that contain old nests and, presumably, high parasite loads. It is suggested that bluebirds prefer re-working old nest material to building a completely new nest, and/or that choice of boxes with old nests actually enhances parasite control because old nests harbor wasp (*Nasonia vitripennis*) larvae that parasitize blood-sucking blowflies (*Protocalliphora sialis*).

PREFERENCIA EN *SIALIA SIALIS* POR CAJAS QUE CONTIENEN NIDOS VIEJOS

Sinopsis.—Individuos del azulejón *Sialia sialis* prefirieron cajas en donde había nidos viejos en 38 de 41 ocasiones en las cuales se les proveyó simultáneamente de cajas con nidos viejos y cajas nuevas. Otras aves que utilizan cajas de la especie mencionada, seleccionaron cajas con nidos viejos en cuatro de cinco ocasiones. Estos resultados entran en conflicto con la opinión prevaleciente de que las aves que anidan en cavidades evitan cajas previamente utilizadas, presumiblemente con altas cantidades de parásitos. Se sugiere que el azulejón prefiere trabajar el material viejo para construir un nuevo nido, y/o que la selección de cajas con nidos viejos mejora el control de parásitos debido a que los nidos viejos contienen larvas de la avispa *Nasonia vitripennis* que parasitan a moscas chupadoras de sangre (*Protocalliphora sialis*).

There is currently no consensus nor the quantitative basis to answer the question of whether old nests should be removed from nest boxes. Møller (1989) criticized nest box studies as a basis for determining avian demography because the effects of ectoparasites, which overwinter in nesting materials, are eliminated. He stated that "... by consistently removing old nests before the nest breeding season loads of ectoparasites are markedly reduced. Nest site quality, reproductive success and nestling growth are thereby improved considerably" (Møller 1989:421). Møller stated further that researchers remove old nests because, with their high parasite load, boxes containing old nests will not be reoccupied except where there is a scarcity of nest sites.

Contradicting Møller's prediction, Thompson and Neill (1991) found no significant difference in the frequency with which House Wrens (*Troglodytes aedon*) chose empty boxes compared to those with old nests. Also, Purple Martins (*Progne subis*) are believed to prefer houses containing

old nests, and Harry Wright, who monitors the numerous colonies at Purple Martin Junction in Griggsville, Illinois, assures us that this belief is well-founded.

Old nests harbor ectoparasites that are known to affect adversely the survival and growth of species such as Purple Martins (Moss and Camin 1970) and Cliff Swallows (*Hirundo pyrrhonota*) (Brown and Brown 1986, Chapman and George 1991). Parasites that overwinter in nests can cause Cliff Swallows to abandon nest sites even in the middle of reproduction (Loye and Carroll 1991), and can cause premature fledging (Chapman and George 1991). Although parasitic lice and mites have been found in nests of the Eastern Bluebird (*Sialia sialis*), there is as yet no evidence of harmful effects on the host (Burtt et al. 1991). High densities of blowfly larvae, on the other hand, have been found to be harmful to young bluebirds (Pinkowski 1977). On the basis of the totality of this information, the possibility exists that, given a choice, bluebirds discriminate against boxes containing old nest material in order to avoid established populations of potentially harmful parasites. In this paper we describe the results of a systematic study that tests the preference of bluebirds for clean boxes or for boxes containing old nests.

METHODS

This study was performed at the Bluegrass Army Depot in the Outer Bluegrass Physiographic Region of Madison County, Kentucky (37°43′N, 84°15′W). The climate is temperate, humid and continental, and the landscape is rolling. Our work was done on a portion of the Depot that is primarily fescue (*Festuca elatior*) pasture with trees occurring as scattered individuals and along fencerows and streams. As entrance to the Depot is restricted, there is essentially no human disturbance of bluebird nesting. On the basis of the criteria given by Parren (1991), our study area represents near-optimum bluebird habitat.

We selected 50 power poles where bluebirds had nested in boxes in 1992. We removed all boxes and replaced them with pairs of boxes. One box of each pair contained a bluebird nest that had fledged young in 1992. Boxes with old nests were brought in from another area; therefore bluebirds could not be returning to the box and site where they had nested previously. The empty boxes were made of used, weathered lumber. All boxes were mounted about 1.5 m above ground, side by side, with the openings of the two boxes about 15 cm apart. Bearings of the box entrances were between 55° east of south and 70° west of south. The relative position of the two boxes was reversed at each successive station.

All boxes had slot entrances 2.9 × 10 cm, with the lower edge of the entrance 12.5 cm above the floor. The floors were 10 × 10 cm. For each box containing an old nest we measured the distance from the top of the nest to the bottom of the entrance and then added pieces of wood to the empty box in order to make the effective depth the same for both members of each pair. All boxes were in place in October 1992, were checked in January 1993, and were monitored weekly from March through June

or until one box of each pair contained eggs. We considered a box to be used after a nest was constructed and one or more eggs laid.

RESULTS

Bluebirds showed a strong preference for boxes containing old nests: eggs were laid in boxes with old nests at 38 locations, and in empty boxes at three locations. In one location each, House Wrens, White-breasted Nuthatches (*Sitta carolinensis*), and Carolina Chickadees (*Parus carolinensis*) laid eggs in boxes with old bluebird nests; Tree Swallows (*Tachycineta bicolor*) laid eggs in an empty box at one location, and in a box containing an old nest at another location. Four of the original 50 locations were not used.

DISCUSSION

There are two likely reasons why bluebirds preferred boxes containing old nests rather than empty boxes. A bluebird nest is a neat cup. As the young birds grow their weight packs the nesting material so that a used nest is generally flat and firm. We observed that about one-third of the new nests began taking shape even before any new nest material was brought into the box; in one case the birds brought in no new material, but simply reshaped and used the old nest. We observed no apparent relationship between initial depth from the entrance to the top of the old nest and the tendency to re-use some of the old nest material. Therefore there is no evidence to support an alternative explanation that bluebirds chose boxes with old nests simply because they could deepen them by reworking the old nests.

A second possible explanation for selection of boxes containing old nests relates to the life histories of parasites. Mason (1944), and Darling and Thomson-Delaney (1993) pointed out that blood-sucking blowfly (*Protocalliphora sialis*) larvae that inhabit bluebird nests, overwinter as adults outside the boxes, whereas wasps (*Nasonia vitripennis*) that parasitize and kill blowfly pupae overwinter in the boxes, with dozens of wasp larvae in each blowfly pupa. Removing old nests in the fall or spring might therefore destroy the parasitic wasps and ultimately lead to higher populations of blowflies. Although Roby et al. (1992), and Wittmann and Beason (1992), found no effect of moderate levels of blowfly parasitism on nestling survival or growth, Pinkowski (1977) found that high densities of blowfly larvae were harmful to young bluebirds. In light of these relationships, our findings that bluebirds prefer to nest in boxes containing old nests could possibly be explained by natural selection favoring birds that nest in cavities containing old nests with parasitic wasps, rather than birds that nest in empty cavities with no wasps.

Mason (1944) found that in Massachusetts, *Nasonia* wasps emerged as adults in late spring and early summer, after bluebirds had started nesting. He recommended cleaning boxes once a year, at the latest possible date prior to their occupancy by bluebirds. Even though *Nasonia* will not have emerged at this time, Mason concluded that sweeping the old nest

onto the ground below the box at this time is preferable to cleaning in autumn. Alternatively, he suggested that nests be removed from only every other box, leaving nests in the remaining boxes to provide habitat for *Nasonia*. Mason believed that the latter alternative would reduce the number of nesting birds, however, ". . . because empty boxes would be preferred by the birds to those containing old nest material" (Mason 1944:245). Our findings suggest otherwise. Rather than annual removing old nests, it may be best to leave them in place until they have accumulated to the point where the box has become too shallow to be attractive to bluebirds.

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