

Sialia

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Index

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Of
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Bluebird Society



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Sialia means bluebirds. Hence the title of this journal. Technically, *sialia* is the Latinized, neuter plural version of the Greek word *sialia*, a noun meaning a "kind of bird." Since the Eastern Bluebird was the first bluebird classified by Carolus Linnaeus (1707-1778), he gave it the species name *sialis*, though he placed it in the genus *Motacilla* which is now reserved for the wagtails. It was William Swainson (1789-1855), who, in 1827, decided that the bluebirds needed a genus of their own within the thrush family (*Turdidae*). He selected the generic name *Sialia* which he simply adapted from the species name *sialis* which Linnaeus had used. Therefore, the scientific name for the Eastern Bluebird is *Sialia sialis* (pronounced see-ahl'-ee-ah see-ahl-iss). Similarly, the Western Bluebird and Mountain Bluebird, the two other species within the genus, were named *Sialia mexicana* and *Sialia currucoides* (coo-roo-coy-dees) respectively. Their species names are descriptive of their locations. All three bluebird species are native only to the North American continent, although each inhabits different regions generally separated by the Rocky Mountains and by altitudinal preferences.

While the adult birds all show differing plumages, the young of all three species look remarkably alike, prominently displaying spotted breasts and large white eye rings. This similarity in plumage was the principal reason the Society chose the juvenal bluebird for its logo. Since bluebirds almost always choose to raise their young in small enclosed cavities, a young bluebird sitting near a nesting box seemed to symbolize our mission. The hope of any species resides in its young. Because of bluebird nesting preferences, the survival of their young may depend on the nesting box, especially since natural cavities, for a variety of reasons, are disappearing rapidly. The theme of bluebird young nurtured in man-made structures will be a recurring one in our art and literature. We hope that this theme will remind all about the plight of the bluebird, and will stimulate action which will allow this beautiful creature to prosper.

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About Bluebirds

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COVER

A male Northern Flicker is the cover subject chosen by Art Editor M. Suzanne Probst.

Sialia welcomes original articles, art and photographs for publication. Although this journal is named for the bluebird, material relating to all native cavity nesting species will be considered. Manuscripts should be typed neatly and double-spaced. All material submitted is subject to editing or rewriting. Submit the original manuscript plus a duplicate copy if you wish to proof the material before publication. If the article has been submitted elsewhere (or previously published) that fact must be stated at the time of submission. All manuscripts will be acknowledged. Black and white glossy photographs are preferred. Print the subject, names of individuals pictured, photographer and return address on the back of each photograph. Art is welcome and should be in black pen-and-ink. We do not assume responsibility for manuscripts, photographs or art submitted. The editor's address is 10617 Graeoch Road, Laurel, Maryland 20723.

Presidential Points

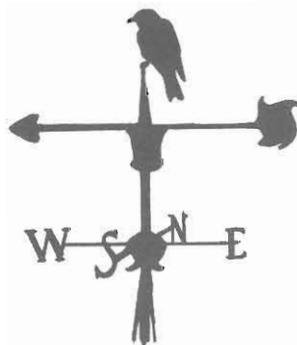
Sadie Dorber

The autumn olive hedge that we planted for wildlife several years ago provided food for several species of birds during the fall as well as great entertainment for us. If I walked slowly past the hedge, most birds merely moved to the other side, where they would still be visible.

From summer through late fall, we were fortunate to have two flocks of Wild Turkeys around the house. One flock had 11 young birds, while the other group contained 16. At almost any hour of the day, turkeys could be seen on the lawn or in nearby fields. On a few occasions, I would nearly run into turkeys as I walked around the corner of the house. As the autumn olive ripened, the turkeys ate the fruit that was near the ground. They soon depleted the supply that was easy to reach and would fly to the top of the shrubs to feed. We greatly enjoyed this free show, but it didn't last long as the berries quickly disappeared.

In the Summer 1991 issue of *Sialia*, I addressed the problem of bluebirds exploring any hole large enough to permit their entry. A bluebird hazard of this type that has been brought to my attention are tree shelters. A tree shelter is a translucent plastic tube placed around seedlings or transplants at planting time. The shelters create a greenhouse environment for individual plants that increases survival, accelerates growth and provides protection from animals. Tree shelters are also very attractive to bluebirds because they provide perch points and an opening to explore. Unfortunately, when a bird drops into the vertical opening, it becomes trapped by the smooth sides and comparatively small diameter and soon dies.

Tubex, the distributor for the tree shelters, immediately enlisted the help of nurseryman/bluebirder Jack Finch to help find a solution to this problem. A flexible, tubular mesh placed over the top of the shelter would prevent the bluebirds' entry and still allow the tree



terminal to grow above the entrance. Tubex provided the mesh free with every order and encouraged tree farmers to request free mesh for shelters that had been previously purchased.

The mesh, when installed properly, virtually eliminated the problem of bluebirds entering the tree shelters. The mesh, however, turned out to be attractive to starlings and grackles for nesting material. The birds were apparently able to pull the mesh off the tree shelters, thus leaving an opening which a bluebird could enter. Also, if mesh was not installed correctly on the tree shelters, it would sometimes blow off in strong winds. Tubex sent different mesh styles to Jack Finch and me for comments; both of us will be testing various mesh styles during the coming growing season. A mesh that will prevent bluebirds from entering a tree shelter has to permit tree terminals to exit without damaging the tips; it also must stay in place during strong winds. The mesh we will test will be biodegradable; the amount of time for the breakdown process will be checked at different locations in the United States.

Tubex and the North American Bluebird Society continue to work together to find a suitable mesh for tree shelters. Many problems defy an overnight solution, but we're both confident that, in the end, we'll develop a solution that's suitable for both the bluebird and the trees. Tree farmers are encouraged to call Tubex (1-800-24TUBEX) with any tree shelter problem, and I would welcome comments on this subject from our members who are tree farmers/bluebirders. ■

Competition Between European Starlings and Native Woodpeckers For Nest Cavities in Ohio

Danny J. Ingold and Robin J. Densmore

Introduction

Cavity nesting birds are reproductively limited by the availability of suitable nest sites (Mannan *et al.* 1980; Cody 1985). Woodpeckers, a group capable of excavating their own nest cavities, are often limited by the presence of dead or dying trees, whereas bluebirds, swallows and other secondary cavity nesters are limited by the actual number of available cavities. European Starlings (*Sturnus vulgaris*), an exotic secondary cavity nesting species, are known to compete with several native North American cavity nesters (Zeleny 1969, Jackson 1976, Short 1979, Sutton 1984, Weitzel 1988, Kerpez and Smith 1990). In a five-year study Ingold (1989a, 1989b) conducted in Mississippi, he found that Red-bellied Woodpeckers (*Melanerpes carolinus*) actually suffered reductions in their reproductive success as a result of starling harassment. On the other hand, he was unable to document similar reductions among Red-headed Woodpeckers (*M. erythrocephalus*) (Ingold 1989a). Kerpez and Smith (1990) found in Arizona that even though starlings competed intensely with Gila Woodpeckers (*M. uropygialis*), they did not compete with Northern Flickers (*Colaptes auratus*). Thus, although starlings interact with many cavity nesting species, they do not necessarily adversely affect the reproductive success of all of them.

Red-bellied and Red-headed Woodpeckers and Northern Flickers are common primary cavity nesting species whose ranges overlap in eastern North America. In Ohio, Red-bellieds are a locally common permanent resident, while flickers are a common to abundant summer resident (Peterjohn *et al.* 1987). Red-headed, however, are considered a rare to locally uncommon summer resident in the eastern counties (Peterjohn *et al.* 1987). European Starlings are an abundant permanent resident throughout the state. All three of these woodpecker species have been reported to lose nest cavities to starlings (Bent 1939, Reller 1972, Jackson 1976, Ingold 1989a, 1989b), and since Red-bellieds and flickers initiate nesting early in the season (at the same time starlings do), they could be more vulnerable to starling harassment.

In order to determine the extent to which starlings compete with Red-bellieds, Red-headed and flickers in Ohio, we set out to do the following: (1) quantify the timing of nesting of each species, (2) determine if there is any correlation between the aggressive nature of these woodpecker species and their success when defending their nest cavities against starlings, and (3) determine if any of these species are suffering reductions in their reproductive success as a result of starling harassment.

Study Area and Methods

From early April through late August of 1990 and 1991, we located active woodpecker and starling nest cavities on the Muskingum College campus, in the city of New Concord, and on several agricultural areas around New Concord, in Muskingum and Guernsey Counties. The various sites constitute a variety of habitats

ranging from lawns with scattered trees to wooded pasturelands to patches of dense forest. The dominant tree species on most sites include maples (*Acer sp.*), black locusts (*Robinia pseudoacacia*), sycamores (*Platanus occidentalis*), beeches (*Fagus grandifolia*), and oaks (*Quercus sp.*). We monitored each active woodpecker

activity for at least 30 minutes every five days to determine the status and detect possible starling/woodpecker interactions. We quantified all interactions and made careful note of those cavities usurped by starlings. Each week we climbed to the cavities that could be reached to confirm occupancy and nest status. To facilitate individual recognition among the woodpeckers, we captured and color-banded as many adults and nestlings as possible during both seasons.

Results

Nest starts by starlings and Red-bellieds during both seasons were initiated during late March and early April. During this period, Red-bellieds were frequently harassed by starlings and consequently forced into an extended period of nest excavation that lasted throughout the month of April and into mid-May. Of 12 Red-bellied pairs exposed to starling competition in April, at least 9 (75%) were still excavating nest cavities by the second week of May. Conversely, of 7 Red-bellied pairs not exposed to starling harassment (controls), 5 (71%) were incubating eggs by the first week of May.

The nesting period of starlings extended into mid-July; at least 10 of 37 pairs (27%) were successfully double brooded. Red-bellieds fledged young through the second week of August, but none of the 24 pairs raised a second brood after a successful first one.

Flickers initiated nest excavation about two weeks after Red-bellieds and starlings in late April, while Red-headededs didn't begin excavating until the first week of May. Consequently, both species apparently avoided much of the intense starling harassment that Red-bellieds incurred in early April. The nesting period for flickers lasted into the third week of July and for Red-headededs into the third week of August. None of the 29 flicker pairs or 15 Red-headed pairs raised two broods.

Nesting starlings were common on all study sites except for the densely forested patches, and were particularly abundant in town. Conversely, 64

of 68 woodpecker pairs (94%) nested on agricultural and forested areas outside of New Concord. Thus, although competitive interactions among starlings and woodpeckers were frequent, 98% of them (62 of 63) occurred on the rural study sites.

We observed a total of 28 starling/Red-bellied interactions, all near freshly excavated Red-bellied cavities. Nineteen of these (68%) occurred during April when both species were initiating nest efforts (Fig. 1). Using regression analysis, we determined that the number of starling/Red-bellied interactions decreased significantly with the progression of time.

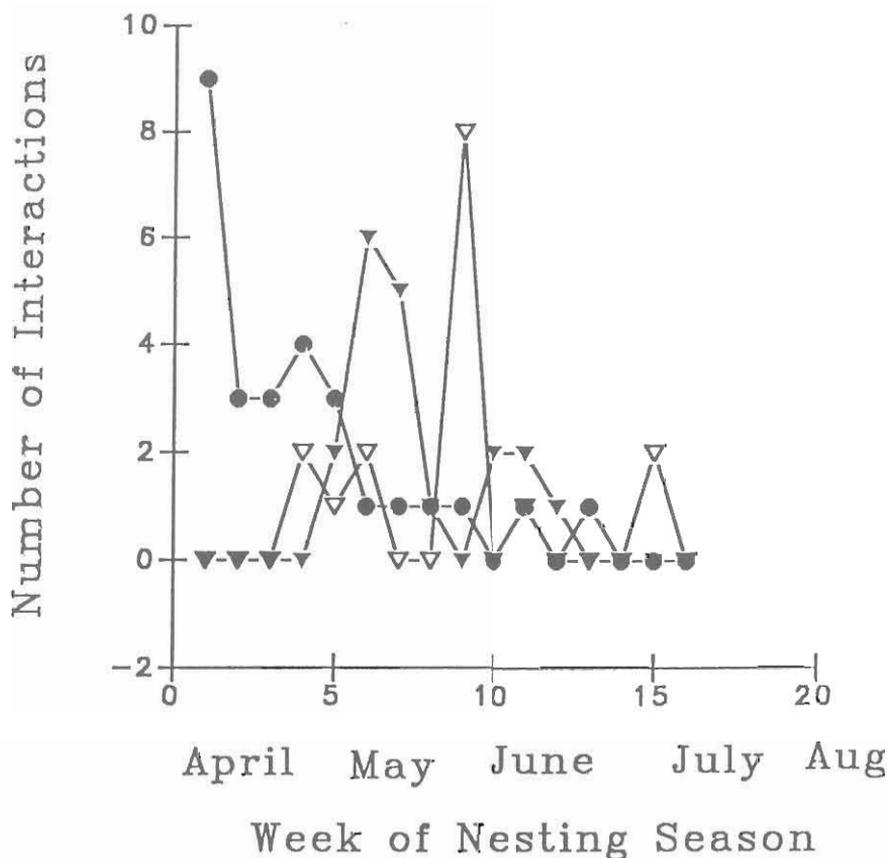
European Starlings and Red-headed Woodpeckers engaged in 19 competitive interactions most of which occurred in May (74%) (Fig. 1). Again we found that, as time in the nesting season progressed, the number of starling/woodpecker interactions decreased significantly. This pattern did not hold for starlings and flickers, however, which engaged in 16 interactions from April through June (Fig. 1).

There were striking differences in the aggressive nature of the woodpecker species. Red-bellieds were dominant in only 36% of the interactions in which they were involved with other species (Table 1). On the other hand, flickers were dominant 55% of the time, Red-headededs 57% of the time, and starlings 53% of the time (Table 1).

Of a total of 31 freshly excavated Red-bellied nest cavities, 13 (42%) were usurped by starlings, mostly during April and early May (Fig. 2). In addition, Red-bellieds lost 2 cavities to flickers and 1 to House Sparrows (*Passer domesticus*), so they were deprived of 52% of their cavities. Of 33 flicker cavities, only 4 (12%) were usurped by starlings (Fig. 2). Flickers lost 2 additional cavities to Red-headededs, however, and thus relinquished a total of 18% of all their cavities. Red-headededs lost only 2 of 20 nest cavities to starlings (10%), as well as 1 to House Sparrows. A regression analysis revealed a significant negative association between the number of Red-bellied cavities usurped by starlings

Figure 1. The timing of competitive interactions between starlings and woodpeckers during 1990-1991 in east-central Ohio (RB = Red-bellied; ST = European Starling; FK = Northern Flicker; RH = Red-headed).

- RB/ST Interactions
- ▽ FK/ST Interactions
- ▼ RH/ST Interactions



and time. Sample sizes were too small to run similar regressions on flicker/starling and Red-headed/starling usurpations and time.

Interestingly, of the 19 woodpecker cavities usurped by starlings, at least 13 of them (68%) were eventually abandoned by the starlings before they began egg laying. Moreover, of a total of 17 woodpecker pairs that lost their

cavities to starlings, at least 10 of them (59%) (6 of 11 Red-bellieds, 2 of 4 flickers, and both Red-headed) eventually excavated new cavities in the same circular hectare (or reclaimed their original cavity after starlings abandoned it), and were successful in fledging some young. However, we reemphasize that none of the woodpecker pairs, including at least 17 pairs that nested

Table 1. Summary of the competitive interactions between starlings and woodpeckers during 1990-1991. Aggressor species are listed in the left-hand vertical column and intimidated species are listed in the top horizontal column (RB = Red-bellied; NF = Northern Flicker; RH = Red-headed).

SUMMARY OF INTERACTIONS

AGGRESSOR SPECIES	INTIMIDATED SPECIES				TOTALS
	STARLING	RB	NF	RH	
STARLING	X	13	6	5	24 (53%)
RED-BELLIED WP	9	X	3	0	12 (36%)
NORTHERN FLK	6	5	X	5	16 (55%)
RED-HEADED WP	6	3	4	X	13 (57%)

in the absence of starlings, raised two broods.

Thus far, we've been unable to climb to enough woodpecker cavities to determine whether or not any significant trends exist in the clutch sizes and/or nestling numbers of competing versus control pairs. Red-bellieds and Red-headededs excavated nest cavities at significantly greater mean heights (35.8 feet [10.9 m] and 32.5 feet [9.9 m], respectively) than the mean height of cavities in which starlings nested (20.7 feet [6.3 m]) (one-way ANOVA; $P < 0.05$). In addition, flickers excavated nest cavities at a mean height of 27.9 feet (8.5 m). Consequently, many of these cavities were inaccessible.

Discussion

These data suggest that interference competition (Levine 1976, Maurer 1984) between starlings and one or more of these woodpecker species in east-central Ohio does occur and is perhaps common. Red-bellied Woodpeckers were particularly vulnerable to European Starlings possibly for two reasons: (1) they initiated nest excavation, in late March and early April

at the same time starlings began to search for fresh nest cavities, and (2) Red-bellieds were significantly less aggressive than starlings and the other woodpeckers when defending their nest cavities against competitors. Ingold (1989a, 1989b) documented similar trends between starlings and Red-bellieds in Mississippi in which competing Red-bellieds suffered reductions in reproductive output.

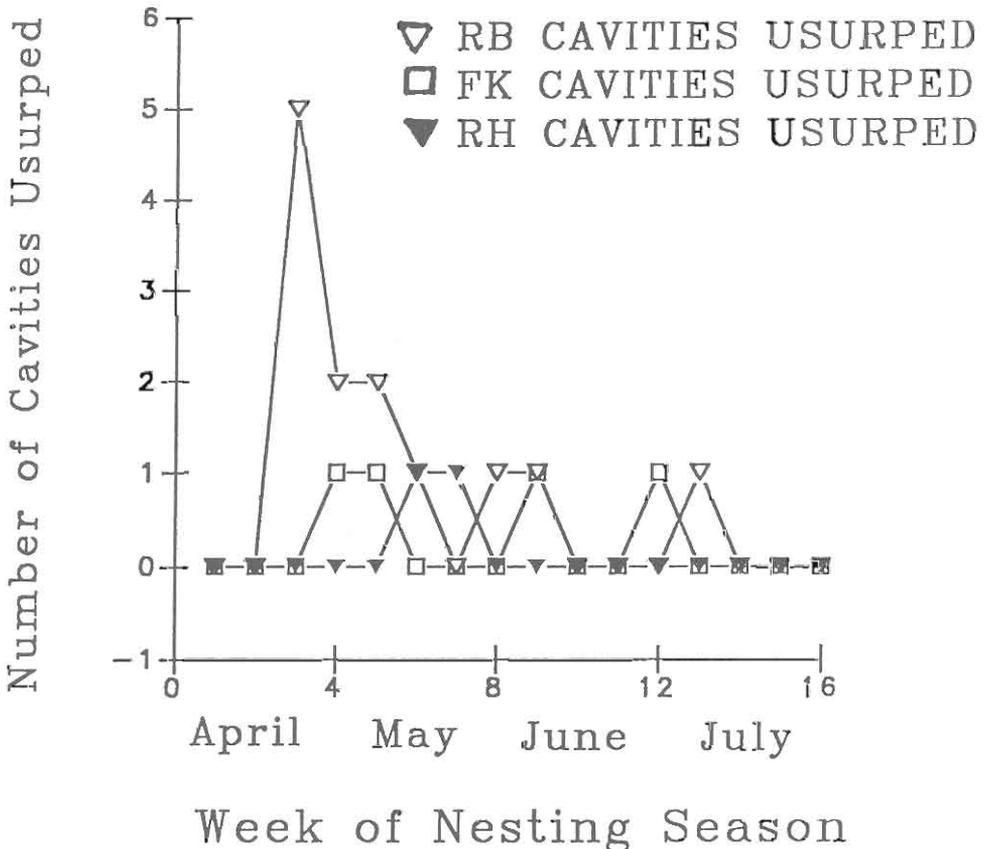
Although the timing of the Northern Flicker nesting effort overlapped the starling effort to some extent, flickers were less vulnerable to starling harassment. By the time the flicker nest excavation period peaked during the last week of April, many starling pairs had already secured nest cavities. Additionally, flickers (which are slightly larger than the other three species) defended their nest cavities more aggressively than Red-bellieds. Similarly, Red-headed Woodpeckers fared well against starlings. By the time Red-headededs initiated cavity excavation during the first two weeks of May, most starlings were well into their first nest effort. Like flickers, Red-headededs were usually the aggressors in competitive interactions near their nest cavities.

Although nesting starlings were abundant in town and on the Muskingum campus, surprisingly few woodpecker pairs (3 of 68; 4%) were found in these areas. This perhaps explains why only 4 of 22 starling pairs in town (18%) nested in excavated cavities. Thus, although excavated cavities on campus and in town appear to be in short supply, natural knot cavities are plentiful. We found six trees in which two or more starling pairs nested simultaneously within a few yards of each other, all in natural cavities. Ingold (1989a, 1990) commonly found nesting Red-bellied and Red-headed Woodpeckers, as well as starlings, in town and on campus in Mis-

issippi. It is possible that woodpeckers in the Ohio study were limited by the availability of suitable nest trees in town, or it is more likely that the abundance of town and campus starlings precluded them from attempting nesting efforts.

Differences in cavity-site and habitat parameters among these species are similar to those reported in previous studies (Reller 1972, Jackson 1976). Flickers and Red-headeds nested more frequently in dead trees (snags), while Red-bellieds and starlings chose the dying branches of living trees more often. Ingold (1989a) found a similar trend in Mississippi and discussed the possibility that star-

Figure 2. The timing of cavity usurpations by starlings from woodpeckers during 1990-1991 in east-central Ohio (RB = Red-bellied; FK = Northern Flicker; RH = Red-headed).



lings may actively seek out living trees for nest sites. In this study the large number of living trees in which starlings chose to nest may be a reflection of availability. In town and on campus, snags are scarce and starlings had few options. In rural areas, however, starlings nested commonly in large snags situated in open areas.

Red-bellieds and flickers both showed a propensity for nesting in wooded areas, whereas starlings and Red-headed were more likely to nest in open areas. Moreover, all three woodpecker species nested in areas with significantly more ground vegetation than did starlings. Again, this is likely the result of several starling pairs nesting in town in areas surrounded by lawns and roads. Although country-nesting starlings virtually always nested in open areas, the amount of ground vegetation did not seem to be an influential factor in their choice of nest sites. Ingold (1989a) observed similar trends in Mississippi, and suggested that Red-bellieds that choose to nest in more heavily wooded areas would be most successful at avoiding starlings.

Although our data suggest that nest-site competition is occurring, particularly among starlings and Red-bellieds, we have no evidence to suggest that any of these woodpecker species suffered significant reductions in fecundity as a result of starling interference. Many of the woodpecker pairs that lost cavities to starlings (at least 59%) were eventually successful in fledging some young later in the season. Since, to our knowledge, none of the woodpecker pairs we observed were double brooded, including 17 pairs nesting in the absence of starlings, a delay in nesting caused by starlings may not be significantly detrimental. On the other hand, such a delay could expose woodpeckers to food shortages and increased temperatures that might have some negative effects on their reproductive success. Thus, the outcome of starling/woodpecker competition for nest cavities in Ohio is still uncertain. Competing woodpeck-

ers (particularly Red-bellieds) may shift their nesting efforts to later in the season to avoid starlings, or they could choose to nest in more densely forested areas where most nesting starlings are absent. It is also possible that competing woodpeckers may gradually become more aggressive, and thus more effective nest-site competitors with starlings. Finally, it is the opinion of the authors that a threat tantamount to starling competition for many woodpecker species is the loss of suitable nesting habitat (namely dead trees and limbs). Without an adequate number of dying or dead nest trees in an area, nest-site competition involving woodpecker species would not be possible in the first place. ■

Acknowledgements

This research was funded by the Ohio Department of Natural Resources and the Muskingum College Green Foundation. We thank the many kind farmers in Muskingum and Guernsey counties who allowed us access to their land.

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1991 Nesting Box Report

Kevin L. Berner, Donald J. Clark, Frank J. MacDougall, and Jessica Ambert

Introduction

The North American Bluebird Society has been conducting nest box surveys of its members each year since the 1980 season. With the exception of 1981, the total number of bluebirds fledged has increased each year, from 11,210 in 1980 to 73,669 in 1991. The 1991 total represents an increase from last year's total of 64,192 for the three bluebird species.

The steady increase in fledging rates is probably attributable to both an increase in bluebird numbers and to a higher rate of reporting by people who have bluebird boxes. Year to year fluctuations within the three reporting regions (defined in Table 1) of the bluebirds' ranges may reflect the ability of larger bluebird groups to gather all their members' data in time to complete the annual NABS report. While many individuals report on a handful of boxes on their property, a few very large groups are responsible for a high percentage of the fledglings reported. Regional totals can fluctuate widely when some of these group totals are included one year but not the next.

Students at the State University of New York at Cobleskill summarized most of this year's surveys. This year we created the "unspecified designs" category in which to place data from respondents who did not identify boxes by dimension or type. The survey form included three categories: boxes with internal floor dimensions of 4 in. (10.2 cm) x 4 in. or 5 in. (12.7 cm) x 5 in., or "other" which would include Peterson, PVC, or numerous other less traditional box styles. In most previous years, unspecified box data were included in the "other" box category. In last year's summary, I included data from unspecified boxes only in the overall totals and used the "other" category for the specific types such as those listed above. Ideally, all data should be listed in reports by box style; however, this was difficult for most large groups which summarized data from hundreds of individuals. Inconsistently reported data made it impossible for all the tabulated data to add up as expected due to the lack of information. Some survey sheets specified the number of boxes of each given type, but then only listed the total number of boxes used, not separating the tallies by box type. Many groups were only able to give the total number of boxes and number of birds fledged. The results reported in Table 1 are the best possible summary of the data as it was submitted.

Out of a total of 39,920 boxes reported in this year's survey, 14,059 were used by bluebirds, more than by any other type of bird. Swallows (Tree and Violet-green) were the next most commonly observed birds using boxes, followed by wrens (House, Carolina, and Bewick's), chickadees (Black-capped and Carolina), titmice (Tufted and Plain), nuthatches (White-breasted, Brown-headed, and Red-breasted), and flycatchers (Great Crested and Ash-throated) (See Table 1). Prothonotary Warblers were also reported to have used a few boxes. Specific data on the different box types are also included in the table.

EAST

In the eastern region, most of the 250 reports came from individual box holders and fewer from large groups, compared to central and western regions, where large groups dominated the survey results. One exception was the report from the Schoharie County

Bluebird Society in upstate New York. This group received reports indicating that 1,905 Eastern Bluebirds, 1,432 Tree Swallows, 917 House Wrens and 73 Black-capped Chickadees had fledged from 2,081 nest boxes. This was the sixth consecutive year of in-

creased bluebird fledging reported by the group since its initiation by Ray Briggs in 1985. Dan Schuppel once again led county individuals, fledging 101 bluebirds on his trail of 63 boxes. Due to less cold and damp weather in the early nesting season, reports of weather-related losses dropped sharply from 312 bluebird chicks found dead in boxes in 1990 to 154 in 1991. Similar declines were noted for other species. Extremely high raccoon populations resulted in fairly high levels of nest predation in the county.

The Howard County Bird Club of Maryland reported that bluebirds used 244 of the 748 boxes monitored by the club's members. A total of 1,421 bluebirds were fledged from 2,096 eggs. Five hundred and eight of the bluebird eggs laid did not hatch and an additional 167 young were lost.

Many surveys reported loss of bluebird eggs or young to predators. Ruth Crutchely of Damascus, Maryland lost a nesting bluebird to a kestrel. Jennifer Carranza, a naturalist for Pennsylvania Power and Light Company, reported persistent problems with wrens destroying bluebird nests. Her nest boxes are traditionally-shaped boxes with the 1 3/8 in. (3.5 cm) x 2 1/4 in. (5.7 cm) oval entrance like those used on Peterson nest boxes. Ten of her 22 boxes were used by bluebirds while others were used by chickadees, titmice, and wrens.

Another species reported to have caused bluebird nest abandonment was the Northern Mockingbird. Maria Pfeifer of Columbus, Georgia had a bluebird nest of four eggs abandoned due to harassment by that species. Several other respondents described harassment of bluebirds by mockingbirds. Raymond Marr of the Audubon Society of Rhode Island described a mockingbird which would not allow bluebirds to take food to their nestlings. The mockingbird eventually caused the bluebirds to abandon. Cathy Reno of the Alachua Audubon Society in Florida also reported that a mockingbird caused bluebird nest abandonment.

Gale Burton of Enola, Pennsylvania has tried to reduce House Spar-

row problems through an aggressive trapping effort. She has trapped 123 sparrows on a one acre property, thus allowing the fledging of seven bluebirds from her six boxes. Clyde Rearick trapped 36 female and two male House Sparrows on his Oil City, Pennsylvania trail. He feels that by changing to deep boxes he has eliminated his raccoon predation problems.

Another songbird predator was observed by Bruce Becker of Hackettstown, New Jersey. He witnessed a Blue Jay carry off a Tufted Titmouse that had fledged from its nest. Blue Jays also killed a fledgling bluebird, according to Gail Fuhrer of Montague, Massachusetts.

An unexpected species was found in nest boxes. Six Cuban tree frogs were observed in a box by June Huss in Ft. Myers, Florida.

Mark Trocino of Powder Springs, Georgia provided mealworms as supplemental food for bluebirds in his boxes. The adults were given 15 to 25 mealworms each day during the period that chicks were in the nest. Lee and Margaret Marks of Woodstock, Georgia also fed mealworms to their bluebirds while chicks were in the nest; they fledged in 16 days.

Bluebirds have returned to Fred Thurber's trail following at least a 15 year absence from the area. He has 80 boxes, 30 of which were used by swallows, five by wrens, and one each by chickadees and bluebirds. House Sparrows killed the adult bluebird after the young fledged.

Frances Sawyer of Stone Mountain, Georgia hopes that her nest boxes on the three Stone Mountain golf courses will produce a large population of bluebirds by the time the 1996 Summer Olympics are held in the area. This year she fledged 50 bluebirds from 31 boxes.

Susan Moran fledged a record 77 bluebirds from her 21 boxes on a trail that she has maintained for 20 years. She uses carpet tacking strips on metal posts to reduce predation along her Potomac, Maryland trail.

Charles Abbey of Clemmons North Carolina reported results for 94 boxes, both 4 in. x 4 in. regular and 5 in.

x 5 in. slot boxes. Over 50% of both styles were used by bluebirds.

Thomas Mulvey has had a trail on Colliers Mills Wildlife Management Area in New Jersey since 1975. During this time he has fledged 1,640 bluebirds at the site. This season bluebirds built a total of 47 nests using each of his 20 boxes. Since installing a conical metal guard on each mounting post, he has raised his average annual bluebird fledging rate from 125 to 160 per year.

Lorna Beasely has had Eastern Screech-Owls use boxes in Live Oak, Florida for 12 straight years. Scott Adamson at the Genesee Country Nature Center in Mumfordsville, New York also had screech-owls, but they were in Wood Duck boxes. At the nature center, eight owls fledged along with 8 American Kestrels, 438 Wood Ducks, 33 Hooded Mergansers, 10 Great Crested Flycatchers (in a Wood Duck box), and 71 Eastern Bluebirds, as well as Black-capped Chickadees, Tree Swallows, and House Wrens.

The Wayne County (New York) Nestbox Network initiated by Joby Lawson as a junior high student is continuing to grow. Joby, now a college graduate, still coordinates the group which this year fledged 96 bluebirds and several other species from the group's 383 boxes.

One hundred families reported their nest box results to the Battle Creek Cypress Swamp Nature Center in Prince Frederick, Maryland. Andy Brown reports that the 340 monitored boxes fledged 878 bluebirds. They had a 90% hatching rate and 95.4% fledging rate for eggs that hatched.

CENTRAL

States and provinces in the central region were represented by 207 survey reports and produced 35,426 bluebirds. Most of the boxes reported were not classified as either 4 in. or 5 in. square boxes, which may reflect the high use of Peterson boxes in several states in this region.

Pat Baldwin of McClure, Illinois had both of her two bluebird nestings in six-sided nesting boxes. These

boxes had false bottoms allowing them to sit on 3 in. (7.6 cm) PVC pipes.

Sue Wells of Camden Point, Missouri had a Red-headed Woodpecker use a 5 in. x 5 in. box. It laid five eggs, all of which successfully hatched and fledged.

Betty Rasinski of Little Falls, Minnesota reported that she used raised wire mesh in the bottom of her nest boxes but still noticed numerous blowfly larvae in the nest itself and none on the box bottom below the mesh.

David Knoebber of LaGrange, Illinois reported having very good luck at controlling losses to raccoons using axle grease on his pole mounts. He also feels that bluebirds in his area appear to protect nest sites more aggressively than they did 20 years ago and are less readily chased off by other birds. David Durnell of St. Marys, Ohio has reduced his raccoon predation problems using Jim Noel wire raccoon guards.

Kathryn Kropp of Houston, Texas reported rat snake predation of bluebird eggs in her boxes. Clara Beedy of Lockney, Texas reported that a pygmy rattlesnake got into a box and ate one egg. She also reports that nighttime predation by other species has been eliminated using Noel guards.

Paul Allen of Mountain Home, Arkansas caught approximately 75 House Sparrows using an ST-1 model sparrow trap. He has also built and sold over 200 bluebird nesting boxes in the last four years.

F. Hamerstrom of Plainfield, Wisconsin has 50 kestrel boxes which have been used by American Kestrels, Great Crested Flycatchers, Wood Ducks, and mergansers.

Cathryn Kurtagh of Highland Park, Michigan has had good results from placing boxes in pairs. She feels that it has reduced competition with swallows and has provided an alternate nest site for bluebirds following vandalism or harassment.

Wagoner, Oklahoma resident Carolyn Fessler again had Prothonotary Warblers use a bluebird box. Two of the first clutch of eggs resulted in

fledged young, but a single egg in the second nesting was abandoned.

John McCall of Cleveland, Tennessee was pleasantly surprised to fledge 59 bluebirds from his 31 boxes. This was the first year that he had any boxes.

Dick Walker of Loogootee, Indiana used 91 boxes made from 4 in. PVC pipe with smoked plastic inserts for the box bottoms. He found that House Sparrows avoided boxes with lighted bottoms created by saw kerfs near the base because they preferred a dark cavity. He said that although it took them two years to learn to use the dark-interior PVC boxes he first put up, he expects that they may also adapt to these more lighted boxes as well.

Tom Barber of Cambridge, Ohio fledged a record high 261 bluebirds on his four trails this year. This brought his eight year total to 1,177 bluebirds fledged. Five pairs nested three times which was also a record for him. He has had excellent results in reducing raccoon predation by greasing mounting poles.

Robert Rager of Rockford, Ohio monitors 130 boxes. This year four nests contained six eggs—a first for him. He also had 29 white bluebird eggs.

Marilyn Gericke had 14 eggs that did not hatch on two farms where herbicides and pesticides had been sprayed.

Craig Andresen of New Brighton, Minnesota in his first year with trails of 133 Peterson boxes, had 47 boxes used by bluebirds, 45 by wrens, 10 by swallows, and 10 by flycatchers. A total of 178 bluebirds fledged.

This year was the second best in 15 years of monitoring by W.A. Carter of Ada, Oklahoma. His 81 boxes fledged 116 bluebirds, 69 Carolina Chickadees, 34 Tufted Titmouse, and 11 Bewick's Wrens. He says the Bewick's Wrens are still rare there.

Another monitor with a 15 year old trail, John Flindlay, III of Birmingham, Alabama has fledged over 5,100 bluebirds, including 586 this year. In the last 10 years, he has banded over 3,000 young and adult bluebirds; many of his bands have been recovered. All of his

bluebirds are permanent resident birds. He built and maintains all of his 159 nest boxes.

Monitors for the Wheaton Park District in Wheaton, Illinois were impressed with their 19 Tuttle slot boxes because they were avoided by House Sparrows. In the past they have had a very serious sparrow problem, but there were no problems at all with the slot boxes.

Mary Derck of Dryden, Michigan has been testing wren guards similar to the extra wood block used for raccoon protection over the entry hole. She cut the bottom out as described in *Sialia* 11(3):93-95, but has found them to be ineffective in deterring wrens.

The Bluebird Recovery Program of the Audubon Chapter of Minneapolis reported that their monitors documented 11,915 bluebirds fledging from 8,290 boxes within Minnesota. Each year the group publishes a detailed summary of results from a large number of bluebirders both within and outside of Minnesota.

The Iowa Bluebird Recovery Program also publishes an excellent year-end trail summary including a variety of box plans and other information which would be valuable to any bluebird. Their members reported 8,932 bluebirds fledging from 5,143 nest boxes.

WEST

Thirty-three reports were received from the western region. These included several very large trail systems. A total of 22,492 bluebirds (mostly Western and Mountain) were fledged from 11,180 boxes.

Duncan Mackintosh of Alberta reported for the Mountain Bluebird Trails that a record 6,289 bluebirds were fledged, an increase of 2,400 over last year. The group will be sponsoring a Bluebird Conference in Kimberly, British Columbia on June 20-21 at the Kimberly Ski Resort. The event will feature both a number of speakers and a field trip.

John and Katherine Wilson of Sutherlin, Oregon put out a flicker box which was used by a European Starling before they removed this non-native

Table 1. 1991 Nesting Box Data by Geographic Region

Types of Boxes Used	4" x 4"						5" x 5"						Other						Unspecified Design						Total					
	E	C	W	E	C	W	E	C	W	E	C	W	E	C	W	E	C	W	E	C	W	E	C	W	E	C	W	E	C	W
Total Number of Boxes	2861	1884	184	1010	1864	2816	668	1780	4625	4805	13,868	3007	9344	19,396	11,180	39,920														
Boxes Used by Bluebirds	1226	1035	65	359	810	1145	278	965	1723	990	3455	2008	2853	6295	4941	14,059														
No. of Bluebirds Flagged	5482	5599	230	1885	3318	5750	1494	3280	8882	5489	23,229	7630	15,751	35,426	22,492	73,669														
Boxes Used: Chickadees	97	103	14	30	59	6	21	26	28	53	18	3	201	206	51	458														
Boxes Used: Titmice	28	34	12	9	21	1	4	7	11	13	2	0	54	64	24	142														
Boxes Used: Nuthatches	8	4	4	9	10	2	2	1	17	1	0	0	20	15	23	58														
Boxes Used: Swallows	342	116	14	195	299	120	91	183	764	359	32	977	987	630	1875	3492														
Boxes Used: Wrens	205	152	13	42	154	23	37	132	287	172	60	147	456	498	470	1424														
Boxes Used: Flycatchers	2	4	6	3	3	1	2	11	15	0	0	0	7	18	22	47														
Total No. Boxes Used	1908	1502	128	647	1356	1298	435	1325	2845	1588	3567	3135	4587	7696	7406	19,680														
% of Boxes Used by All Species	66.7	79.7	69.6	64.1	72.7	46.1	65.1	74.4	61.5	33.0	25.7	·	49.0	40.0	66.2	49.3														
% of Boxes Used by All Bluebirds	42.8	54.9	35.3	35.5	43.5	40.7	41.6	54.2	37.3	20.6	24.9	66.8	30.5	32.3	44.2	35.2														
% of Boxes Used by Others	23.9	21.9	34.2	28.5	29.3	5.4	23.5	20.2	24.3	12.4	0.8	·	18.5	7.7	22.0	14.1														

† Data for boxes of unspecified design for the western region include errors due to missing data on survey returns.

Geographic Regions According to States and Provinces

East: Bermuda, Connecticut, Delaware, Florida, Georgia, Maine, Maryland, Massachusetts, New Brunswick, New Hampshire, New Jersey, New York, North Carolina, Nova Scotia, Pennsylvania, Quebec, Rhode Island, South Carolina, Vermont, Virginia, Washington, D.C.
 Central: Alabama, Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Ohio, Oklahoma, Ontario, Tennessee, Texas, West Virginia, Wisconsin.
 West: Alaska, Alberta, Arizona, British Columbia, California, Colorado, Idaho, Manitoba, Montana, Nevada, New Mexico, North Dakota, Oregon, Saskatchewan, South Dakota, Utah, Washington, Wyoming.

species. They also had problems with wasps in several boxes.

Alfred Perry of Boise, Idaho reported fledging 1,227 Mountain Bluebirds from 359 of his 370 boxes.

Jan Wasserman fledged a variety of species from her 139 boxes in Ventura County, California. She observed 13 boxes used by Western Bluebirds, 9 by Plain Titmice, 1 by White-breasted Nuthatches, 15 by Violet-green Swallows, 42 by House Wrens, and 7 by Ash-throated Flycatchers.

The Southern Interior Bluebird Trail in British Columbia included 702 boxes of which 472 were actively monitored this year. They fledged 1,130 Western and Mountain Bluebirds.

Elsie Eltzroth of Corvallis, Oregon reported fledging 158 Western Bluebirds from her 188 boxes. She also had boxes used by Black-capped Chickadees, House Sparrows, White-breasted Nuthatches, Tree and Violet-green Swallows, and House Wrens. She noted that at four of the eight sites first brood fledglings were observed feeding nestlings of the second broods. She also noted four instances where "adult bachelor males" were accepted by territorial pairs and observed feeding nestlings of second and third

broods.

Donald Stiles of Calgary, Alberta reported the results of 2,209 nest boxes from which 5,362 Mountain Bluebirds fledged. Wren numbers on the trail have increased greatly over the past three years, from 51 in 1989 to 133 in 1991.

SUMMARY

Many of the survey respondents observed their best year ever. Much of the year to year variation in fledging rates is due to changes in levels of predation and weather conditions. Many members are making progress in their experimentation with predator control techniques. A wide variety of methods are being used to reduce predation by snakes, raccoons, and cats. Many individuals have also shown that, through intensive and continuous trapping, House Sparrows can be controlled, at least within a small area, making it easier for bluebird populations to recover. Unfortunately, bluebird enthusiasts probably will never be successful in controlling the weather. ■

Acknowledgement

I would like to thank Nancy Niles, my fiancée, for reviewing this article and making constructive suggestions for improvements.

(WOODPECKERS— from page 48)

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Announcements

Announcements of regional or state meetings pertaining to cavity nesters should reach us at least four months before publication date of issue in which item will appear. For example, the winter issue is published on 15 January so material should reach us by 15 September.

Mail to Editor J. Solem, 10617 Graefloch Rd., Laurel, MD 20723.

European Starling—Eastern Bluebird Nest Site Competition, IV

Peter A. Zerhusen

Abstract

This is the fourth in a series of articles investigating both the intensity and duration of nest site competition between the European Starling (*Sturnus vulgaris*) and the Eastern Bluebird (*Sialia sialis*). This study covers five nesting seasons over the past eight years. Competition between the two species for available natural nesting sites, with an opening large enough to accommodate a starling, has remained intense. In fact, where starling and bluebird breeding habitats overlap, it is unlikely that any bluebirds are able to nest successfully in natural nesting cavities with large openings. It would also appear that starlings, at some point in the future, may expand their range to occupy all acceptable bluebird habitat. This is likely to further worsen the plight of the bluebird. Evidence was gathered suggesting that peak starling use of nesting sites (March, April, and May) coincides exactly with the period when most bluebirds in this part of Maryland locate a nesting site, build a nest, and rear their first brood. Some support was found for regular annual trapping of adult starlings. Trapping over three consecutive nesting seasons showed declines in adult starling numbers. This initial finding awaits further investigation. Additional evidence was found for the flooding of potential nesting sites by immature starlings during the months of June, July, and August, when bluebirds may attempt to nest a second or third time. The effect of this interference on bluebirds nesting in natural cavities large enough to accept a starling is unknown. Finally, adult male starlings continue to be trapped with greater frequency than their female counterparts. The significance of this finding, if any, awaits further study.

Introduction

This article represents the fourth in a series of articles investigating nest site competition between the European Starling and the Eastern Bluebird. Starlings were first introduced into North America from Europe in 1890 (Chapman 1924). They quickly spread across much of the continent. Like bluebirds, they nest in cavities and, consequently, represent a formidable threat to the Eastern Bluebird. Bluebirds are simply unable to compete successfully with starlings for available natural nesting cavities in which the opening is large enough to accommodate a starling. As a result, starlings must be considered an important cause of the population decline of the bluebird (Zeleny 1976). Although the introduction of the bluebird nesting box with its 1 1/2 inch (3.8 cm) opening has effectively eliminated competition between these two species in these nesting boxes, the

plight of the bluebird can only worsen as starlings continue to expand their breeding range. To assist the bluebird with recovery, it seems essential to understand both the intensity and duration of the natural nest site competition between these two species, as well as the effect of systematic attempts to reduce starling numbers. This study reports on five years of nest site competition between these two species using the 1984, 1985, 1989, 1990, and 1991 nesting seasons.

Methodology

To ensure the reliability and validity of the results, similar, if not identical, methods were employed during all five nesting seasons. The same nesting box was used for trapping European Starlings. The dimensions were 5 1/2 x 6 x 13 in. (13.9 x 15.2 x 33.0 cm). The size of the opening was 2 1/2 in. (6.4 cm) to permit access by European Starlings.

The starling box was located in the same site during all five nesting seasons. The box was placed on the trunk of a deciduous tree at a height of about 5 feet (1.5 m) from the ground. The tree was approximately 60 feet (18.3 m) from the author's residence. The surrounding 15-20 acres consist of cut fields, lawn, and pasture. Bluebird nesting boxes are located within approximately 150 feet (45.7 m) of the starling box. These nesting boxes have been used successfully by bluebirds over the past several years confirming the presence of overlapping habitat.

Monitoring of the starling box occurred from the end of February to the end of August. This represents a typical bluebird nesting timetable for the Maryland area (Zeleny 1976). Peak observation periods occurred each morning before work and most afternoons after work. Weekends permitted additional observation time. The starling box was not monitored during vacation periods. Over the 1990 and 1991 nesting season, vacation time represented an average of about one month out of the six month nesting season. Despite vacations lasting from a few days to as long as three weeks, a complete clutch of starling eggs was never laid. No hatchlings were found during any of the monitored nesting seasons.

The trapping method for starlings was identical over the five year period. A manual trap, similar to the one described by Morris Green in the Winter 1984 issue of *Sialia* (6:8-11), was used. During observation periods, starlings seen entering the nesting box were live-trapped and then disposed of to ensure that each bird would be counted only once.

Beginning with the 1989 nesting season, each trapped starling was sexed. The color of the rami of the lower mandible was used to establish sex. Kessel (1951) reported 100 percent accuracy using this procedure to sex 600 European Starlings. In the female, the lower mandible is pink during the breeding season, while in the male it is blue to blue-black.

Findings

Over five nesting seasons, 335 starlings were trapped (Table 1). This represents a yearly average of 67 birds. On the average more than 51 of these 67 birds were adults. Such numbers suggest potentially intense competition between bluebirds and starlings for available natural nest sites. This finding is even more significant when you consider how many suitable bluebird nesting boxes remain vacant each nesting season. A tentative conclusion might be that whenever starlings have managed to extend their population into the bluebird's breeding range, bluebirds are effectively denied any opportunity to breed successfully in natural cavities with an opening large enough to accommodate a starling.

Table 1 also demonstrates the effect of trapping starlings over three consecutive years (1989, 1990, and 1991). The number of trapped adults decreased from 53 to 51 to 39 birds. Thirty-nine adults is the lowest recorded over the five year period, and represents an 18.8% decrease from the previous low of 48 adult birds in 1984. This evidence suggests that trapping and disposal of starlings may reduce natural nest site competition. Even with the reduction to 39 birds,

Table 1. A Comparison of Trapped Starlings During the 1984, 1985, 1989, 1990, and 1991 Nesting Seasons.

	1984	1985	1989	1990	1991	Totals	Yearly Averages
Adults	48	65	53	51	39	256	51.2
Immatures	11	28	15	11	14	79	15.8
Totals	59	93	68	62	53	335	67.0

Table 2. A Comparison of Trapped Adult Starlings by Month.

	Feb.	Mar.	Apr.	May	June	July	Aug.
1985*	0	17	21	16	7	4	0
1989	1	6	27	17	2	0	0
1990	0	22	10	15	4	0	0
1991	0	10	23	6	0	0	0
Totals	1	55	81	54	13	4	0

*Results not available from 1984 nesting season.

however, the level of competition remains overwhelmingly against the bluebird. Only continued annual live-trapping of starlings will demonstrate if competition can be further reduced.

The results in Table 1 also suggest that there may be considerably more adult starlings than available natural nest sites. An average of more than 51 adult birds attempted to nest in the starling box over a five year period. Oftentimes, as soon as one pair of starlings was trapped, additional birds would begin fighting for the nest site. The impact of a roving population of non-breeding adult starlings on bluebirds could be devastating.

Table 2 records the number of trapped adult starlings by month for the 1985, 1989, 1990, and 1991 nesting seasons. A trend appears to be developing. With the exception of 1990, April (total-81) appears to be the month of the most intensive nesting activity; however, both March (total-55) and May (total-54) continue to represent months of heavy activity. Nesting activity typically begins in March and is substantially reduced by June. The 13 birds trapped in June represent a 76% reduc-

tion from the average total in May. The nesting timetable for starlings appears to approximate that of the bluebird. Bluebirds locate nesting sites in March with the female bluebird typically building a nest for the first time in April. Bluebird nest building occurs at the same time (April) as the most intensive use of nest sites by starlings.

Immature starlings also visit the nest site. Table 3 chronicles immature starling use of the starling nest site box by month over five nesting seasons. As reported earlier (Zerhusen 1986, 1990) immature starlings begin to flood natural nesting sites from June through August, with August (total-33) evidencing the most intensive usage. Visitations by immature starlings coincide with the potential second and third bluebird nestings. The extent to which immature starlings impede or prevent successful nestings by bluebirds in natural cavities in which the opening is large enough to accommodate a starling is unknown. This author has observed immature starlings making protracted investigations of the inside of the starling box, however.

Table 3. Use of Nest Site by Immature Starlings.

	June	July	August:	Totals
1984	0	2	9	11
1985	8	17	3	28
1989	5	1	9	15
1990	4	6	1	11
1991	1	2	11	14
Totals	18	28	33	79

Table 4. Number of Trapped Adult Starlings Segregated by Sex for Years 1989, 1990, and 1991.

	1989	1990	1991	Totals	%
Male	37	33	22	92	64.34
Female	16	18	17	51	35.66

During the 1989 nesting season, it was reported that male starlings were live-trapped at a much higher rate than females (Zerhusen 1990). Table 4 looks at the number of trapped adult starlings according to sex for the nesting seasons 1989, 1990, and 1991. During each season, more males than females were trapped.

The average for the three years is 64.34% for males and 35.66% for females. The reason for the disproportionate number of males remains unclear and awaits further investigation.

Conclusions:

This article has investigated both the intensity and duration of nest site competition between the European Starling and the Eastern Bluebird over five nesting seasons. The results suggest that the competition remains intense. In fact, where bluebirds and starlings share the same breeding range, successful bluebird nestings in natural cavities with openings large enough to accept a starling are probably almost nonexistent. Starlings have spread rapidly across the continent of North America since their introduction in 1890. In many areas, they have become the predominant bird species (Zelensky 1976). Should they at some time in the foreseeable future occupy all of the acceptable bluebird habitat, nesting by bluebirds in natural cavities with large openings almost will cease to exist. This can only worsen the plight of the bluebird.

It would also appear that nest site competition is most intense during the months of March, April, and May. This is precisely the time that bluebirds are locating nesting sites (March), building a nest (April), and rearing young (May)

from their first brood. The nesting time-tables of the two species appear to coincide. In addition, during the months of June, July, and August, when bluebirds have an opportunity to nest a second or third time, immature starlings begin flooding nesting sites. The impact of this behavior on successful bluebird nestings is unknown.

A tentative conclusion drawn from the present study suggests that repeated trapping and removal of starlings over consecutive nesting seasons, i.e., the past three seasons, may begin to reduce starling nest site competition. Although reduced somewhat, the competition remains intense, however. The possibility of further reductions awaits continued investigation.

The results of this study have the following implications. Efforts to aid the bluebird should be linked to reducing the number of European Starlings. As previously mentioned (Zerhusen 1990), live-trapping and disposal is one method. Sterilization of adult male starlings which are released into the wild could be a second method. Finally, a third method could involve the monitoring of a man-made starling box for the purpose of removing nests and eggs in order to prevent starlings from nesting successfully. This represents an alternative for those who are uncomfortable with starling disposal. Preventing the successful nesting of a pair of starlings helps to reduce their numbers, thereby increasing the bluebirds' chances for survival. ■

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(continued on page 72)

Literature Review

T. David Pitts

Sabrosky, C.W., G.F. Bennett, and T.L. Whitworth, 1989. *Bird blow flies (Protocalliphora) in North American (Diptera: Calliphoridae), with notes on the Palearctic species.* Smithsonian Institution Press, Washington, D.C., 312 pages.—

Many members of NABS encounter and recognize the larvae and pupae of bird blowflies. The adult female lays eggs in the nest of a bird; the eggs rapidly hatch, and the larvae then take blood meals from the nestling birds. Only the larval stages, not the adults, must feed on blood. Following three larval stages, or instars, pupation occurs. The adult emerges from the pupa case. Numerous articles in *Sialia* and other journals have dealt with the occurrence and possible effects of bird blowflies on the host birds. This book summarizes most of what is known about bird blowflies, presents a revision of the genus *Protocalliphora* (to which all bird blowflies, as defined by the authors, belong), and, among other things, discusses many of the gaps still remaining in our knowledge of this group of interesting insects.

In the first part of the book, the authors present an introduction to bird blowflies including discussions of topics such as distribution, life history, host relations, collecting, control, and other topics. Many literature references are cited; since I am not familiar with bird blowfly literature, I cannot judge how thorough the authors have been in their literature review. (My feeling is that anyone, such as the senior author, who has pursued a topic for 40 years will probably have missed few relevant manuscripts.) The book does not include much information on the details of life history and biology; the authors state (p. 24) that this will appear in another publication. You will not learn, for example, what adult bird blowflies eat.

The majority of the book is devoted to a revision of the genus *Protocalliphora*; 15 new species are described. For each of the 26 species

now recognized in North America a description of the observed life stages is given, the known host species are listed, the life history and ecology is briefly described, and a range map summarizes the known distribution. Prior to this publication only 10 species of bird blowflies were recognized from North America.

In North America 139 species of birds are known to have been parasitized by bird blowflies. Eastern Bluebirds have served as hosts for three species of bird blowflies (*Protocalliphora hirundo*, *P. shannoni*, and *P. sialia*) while Western and Mountain Bluebirds are known to have hosted only one species (*P. sialia*). The small number of species parasitizing bluebirds is somewhat surprising to me considering that the ranges of many species of bird blowflies overlap and that the authors report an apparent lack of host specificity by most species of bird blowflies. The three species of bird blowflies that parasitize bluebirds also utilize the nests of many other species of birds. In my inspection of about 1,000 nests of Eastern Bluebirds in northwest Tennessee, I have never seen bird blowfly larvae or pupae; yet Carolina Chickadees using the same nest boxes are regularly parasitized. The authors identified the bird blowflies from my chickadee nests as members of one of their newly described species, a species that is not known to parasitize bluebirds.

A tremendous amount of material has been gathered and presented in this book. One of the functions of such monumental works, however, is to allow readers to determine, either directly or indirectly, what is not known about the subject. The authors of this book clearly point out many gaps in our knowledge of bird blowflies. Some examples are as follows: "The biology and ecology of most species are unknown..." (p. 3); "The complete life history has not been observed for any

(Continued on page 70)

A Bathtub for the Birds

Duane B. Diefenbach

No backyard wildlife habitat is complete without a watering place for songbirds. Here are plans for a simple birdbath you can build yourself that is unique and attractive. Less than \$20 in materials is required.

Your local hardware or building supply store has all the supplies you need:

- 1) 8 in. x 96 in. of aluminum flashing
- 2) 1 bag of sand (40 lbs.)
- 3) 2 bags of concrete mix (80 lbs.)
- 4) 2 qts. of concrete patch
- 5) a 1 in. diameter wooden dowel

First, find a place in your yard where you can work with a little sand and concrete. Bend the flashing to form the outline of the birdbath. Attach the two ends of the flashing together using either sheet metal screws or duct tape. Don't limit yourself to a circular birdbath. Make it a unique shape! Spread a layer of sand on the ground, put the flashing on top of it, and fix it in place with stakes around the outside to hold it in place.

The next step is to create the contour for the bottom of the birdbath. Take about two gallons of sand and pour it inside the form. Wet the sand and shape it into a dome. You are making your birdbath upside-down. After you have created the shape you desire, take a 4-inch section of dowel (I used a piece of old broom handle). Insert the dowel at least halfway into the sand. The resulting hole will be a branch holder to serve as a perch. Angle the dowel so the end above the sand points *toward* the alum-

inum flashing. Coat the exposed part of the dowel with vegetable shortening. That way the concrete will not stick to it.

At this point, you also may want to add a decorative rock or other object to the birdbath. Bury in the sand the portion that you want exposed. Leave enough projecting above the sand so the concrete will hold the rock firmly in place.

Now you are ready to mix and pour the concrete. As you pour, be careful not to disturb the sand and dowel. You may want to bury pieces of metal rod, pipe, or hardware cloth in the concrete to give it added strength. Gently pound the surface of the concrete with a wooden block. A short section of 2x4 works well. This will ensure that all the air spaces in the concrete are filled so that you get a smooth finish.

Let the concrete cure for at least 24 hours. Remove the flashing and lift the concrete. Use a garden hose to wash away the sand.

The next step, if you wish, is to use concrete patch to put a smooth finish on the birdbath. Mix according to instructions. Wet the birdbath and put a 1/4-inch thick coating over the basin. Allow this to dry completely.

Now, remove the wooden dowel with pliers. Find a branch to insert in this hole to serve as a perch. Be sure to change the water daily during the first week until salts from the cement no longer form on the water's surface.

My birdbath rests on a stump in the backyard. The birds love it—they drink and bathe in it. Our nest-

ing pair of bluebirds as well as thrashers, finches, and sparrows use it throughout the day. Just at dusk a pair of Mourning Doves arrive. It is one more reason why birds visit my backyard. ■

Georgia Cooperative Fish and Wildlife Research Unit
School of Forest Resources
University of Georgia
Athens, GA 30602



Photograph by Duane F. Diefenbach

Author's completed cement birdbath resting on stump in his backyard.

BLUEBIRD BOOSTERS

Appearing on the inside back cover is a list of those individuals who have made a financial commitment to bluebirds and cavity nesters over and above their annual dues. Such support is essential in maintaining a stable dues structure. We thank the individuals, organizations, and businesses for their generosity.

You, too, can become a Bluebird Booster. For a donation of \$25.00 per issue or \$75.00 per four issues, you can

be designated as an Eastern, Western or Mountain Bluebird Booster (your choice); for \$15.00 per issue or \$50.00 per four issues, be a Fledgling Booster; while \$10.00 per issue or \$25.00 per four issues makes you a Nestling Booster.

All contributions are tax deductible. Mail your check to NABS Boosters, P.O. Box 6295, Silver Spring, MD 20916-6295.

1992 NABS RESEARCH AWARDS

The North American Bluebird Society is pleased to announce the presentation of the ninth annual research grant awards. The 1992 recipients are as follows:

BLUEBIRD GRANT

Dr. Wayne Davis, University of Kentucky

The Betty H. McIlwain Award

Topic: A Better Bluebird Box

STUDENT GRANTS

John P. McCarty, Cornell University

The Impact of Environmental Variability on the Reproductive Success of the Tree Swallow

Janice Simpkin, University of Nevada, Reno

Topic: Reestablishment of a Bluebird Metapopulation in Central Nevada and Dispersal Dynamics Within the Metapopulation

Neil Niemuth, University of Wyoming

Topic: Tracking of Microtine Rodent Populations by Breeding Northern Saw-whet Owls

GENERAL GRANTS

Drs. E. Dale Kennedy and Douglas W. White, Kansas State University

The James L. Williams Award

Topic: Effects of Nest Box Size and Microclimate on Breeding Success of Bewick's Wrens

Brad Semel, McGraw Wildlife Foundation

Topic: The Ecology of Brood Parasitism in the Wood Duck

Charlotte C. Cockran, Northwest Ecological Research Institute

Topic: Reproductive Success of Western and Mountain Bluebirds in Grasshopper Control Areas, and Potential for Using Bluebirds to Control Grasshopper Densities

Rick Baetsen, U.S. Fish and Wildlife Service

Topic: Breeding Biology and Habitat Requirements of the Northern Saw-whet Owl in Northern Michigan, by Surveying Methods and an Artificial Nest Box Program

NABS RESEARCH COMMITTEE

The North American Bluebird Society is most grateful to the Research Committee for their efforts in choosing the recipients of the annual research grant awards. Each committee member reads and evaluates each grant application. Awards are made after careful review and are a pooled consensus. The Research Committee consists of Chairman Kevin Berner, Dr. Jeffrey Brawn, Dr. George Hurst, Dr. T. David

Pitts, and Dr. Theodore Gutzke.

Individuals wishing to endow a named grant can do so as a one-time donation, on an annual basis, as a memorial to loved ones, or as a planned bequest. If you are interested in helping to further bluebird and other cavity nester research, please contact Treasurer Delos C. Dupree, NABS, Box 6295, Silver Spring, MD 20916-6295.

Tests of the Shallow Slot Box

Wayne H. Davis

The shallow slot box is being examined in a continuing search for a nesting box that is unattractive to House Sparrows but acceptable to bluebirds. At this time, the North American Bluebird Society does not recommend it for general use without further study. Research Committee Chairman Kevin Berner has included slot boxes among nesting box types he is testing, and Dr. Davis is continuing his research. Regional differences in box preferences and nesting success are always factors to be considered.

In previous studies we have shown that when given a choice Eastern Bluebirds (*Sialia sialis*) prefer a slot entrance to a circular one (McComb *et al.*, 1987; Davis 1991) and that House Sparrows (*Passer domesticus*) prefer the circular entrance (Davis 1989). In efforts to develop a box that bluebirds like and sparrows won't use, I tested shallow slot boxes. The results were equivocal; sparrows used none of the shallow boxes, whereas bluebirds showed no preference in one area but preferred the deeper boxes in another (Davis 1991). For the 1991 breeding season, I designed a more extensive experiment to get a clearer picture of bluebird preference.

Methods and Materials

I built 194 boxes of two styles. All were made of rough oak, used horse-farm fence one inch (2.5 cm) thick; they had floor dimensions of 4 x 4 inches (10 x 10 cm). All boxes had slot entrances 4 inches (10 cm) wide and 2.9 cm high made by constructing the front so that it came to within 2.9 cm of the flat roof. In half the boxes, the floor was 3 inches (7.6 cm) below the lower lip of the entrance; in the other half, the floor was 5 inches (12.7 cm) below the entrance. In placing the boxes, the two styles were alternated and numbered; the shallow boxes bore the odd numbers. All boxes were placed on farms near Lexington, Kentucky; 74 were on the University of Kentucky (UK) agricultural experiment farms, 60 on a nearby horse farm, and 60 on a nearby cattle farm. At the UK farms all boxes used in previous experiments were removed. The other farms had never had boxes. All farms had resident House Sparrow populations. All parts of all farms were suitable bluebird habitat.

Boxes were placed on livestock fences at regular intervals of 0.1 mile (160 m). All were within a quarter of a mile (400 m) of farm buildings or residences. All boxes were in place by October 1990 to allow the resident House

Sparrows plenty of opportunity to scout them for nest sites. The boxes were checked in late February and monitored weekly from early April through the last fledging in mid-September.

Nests are considered to be used if they contained eggs. Eggs of House Sparrows were removed after clutches were complete to prevent them from fledging young. I did not remove any nests or nesting material brought in by House Sparrows.

Results

Results are shown in Table 1. House Sparrows did not find the shallow boxes very suitable to their needs, using only one of 97 such boxes. They made starts in 10 additional boxes. In each case the sparrows put in some dry grass and then abandoned the site.

Sparrows used 13 of the 97 deeper boxes. In every case they abandoned the sites when their clutches were removed. Apparently both styles of boxes are marginal habitat for House Sparrows when placed low on fences, for they were not persistent when their eggs were removed.

In 5 of the 10 shallow boxes where House Sparrows started nests and

Table 1. Nest Box Use by Eastern Bluebirds and House Sparrows

	Eastern Bluebirds			House Sparrows			
	boxes used	nests only	starts only	boxes used	nests only	starts only	empty boxes
3-inch boxes	34	16	13	1	0	10	12
5-inch boxes	63	11	5	13	5	4	6

abandoned them, bluebirds later moved in and built nests. Bluebirds also nested in 13 of the 22 deeper boxes that had had sparrow nesting activity; this included bluebird nests built upon 7 of 13 nests after the sparrow eggs had been removed.

There was one instance of a sparrow apparently evicting bluebirds. On 2 May a deep box had a bluebird nest with six eggs. On 8 May there were no eggs. A sparrow nest had been built upon the bluebird nest. The sparrows did not use the nest they built.

Unfortunately, although the shallow boxes were of little interest to the sparrows ($P < .01$ for boxes used), the bluebirds also showed a clear preference ($P < .01$ for boxes used) for the deeper ones. There was also a tendency for bluebirds to start or build a nest in a shallow box and not use it. This tendency was also noticed last year.

Recommendations

There are several ways to deal with House Sparrow problems. The most effective method is to trap and kill the sparrows which are not a protected species. If you do not want to do this, you may find my box designs helpful. The 5-inch deep box is probably best, although a 4-inch deep box is very good (bluebirds prefer the 4-inch box to a standard circular entrance box, and sparrows are not very interested; Davis 1991). If sparrows move in, simply remove their nests; in my experience with these boxes sparrows are not persistent. If persistence does occur, place a block of wood in the box to make it more shallow. In places where sparrow problems are especially bad, 3-inch boxes may be useful. ■

Acknowledgements

Felicia Chandler, Kathleen Smith, and Daniel Smith monitored some of the boxes and kept records. Shirley Davis, Paul Chandler, and Scott Ludwig also helped with the field work.

Literature Cited

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 Davis, W.H. 1991. Foiling House Sparrows. *Sialia* 13:51-53.
 McComb, W.C., W.H. Davis and P.N. Allaire. 1987. Excluding starlings from a slot-entrance bluebird nest box. *Wildl. Soc. Bull.* 15:204-207.

School of Biological Sciences
 University of Kentucky
 Lexington, KY 40506

Historian's Request

Please send newspaper and magazine articles about bluebirds to Historian Jane Williams, Box 123, Ware Neck, VA 23178. Be sure name and address of publication, volume and date are included. Photographs of members engaged in publicizing bluebirds or those documenting some unusual occurrence are also welcome. They will be added to scrapbooks which are a permanent record of activity on behalf of bluebirds and other cavity nesters.

Disappearing Bluebird Eggs? A Possible Culprit

Joe Huber

On page 128 in the Autumn 1991 issue of *Sialia*, Mary Lee Warnock asked why she was losing eggs from nest boxes. The boxes, mounted on heavily greased poles, showed no evidence of snake or raccoon predation. Although there is no way to make a positive identification of the predator(s) without observation or physical evidence, I do have another possible solution to the mystery based on recent experience.

During late July 1991, I witnessed the removal of bluebird eggs from a nesting box in my backyard. The bluebirds in this box had begun their third nesting. On 26 July there were four eggs in the nest. Due to the severe

drought in this part of Ohio, the pair was forced to venture farther than normal in search of food. At times, this left the nest box out of their view and unprotected.

On 28 July as I glanced out the window in the direction of the nesting box, I observed a House Wren flying toward me from the vicinity of the box carrying a bluebird egg in its beak. Bluebirds were in hot pursuit, but they were too late. I could tell from the bluebirds' actions that there was trouble in their nest box. When I checked their nest, which had had eggs the previous day, I found it empty. The nest was in

(Concluded at bottom of next page)



One of the Eastern Bluebird eggs dropped by a House Wren after it had removed it from a box in Joe Huber's backyard in Heath, Ohio.

IN MEMORIAM



Each year the spring issue of *Sialia* carries a list of memorial gifts which have been received by the North American Bluebird Society during the preceding year. Contributions can be made as general donations to the Society or can be specified for research, education, or gift memberships.

In memory of Harold E. Bricker

Anita Pickett

In memory of Meade Flinn

Mr. & Mrs. C.A. Abernathy
James H. Bailey
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Mrs. Bess P. Daniel
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Charles & Mary Lee Settle
Peggy D. Smith

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M.H. Squires
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Mrs. Mary Nichols
Mr. & Mrs. Jos. Patterson
Joseph R. Patterson
Susan Puglese
Betty Steinwedel
Ruth P. Smith
Martha Williams
Helen Wotzal

In memory of Florence Porter

Myron E. Whitney

In memory of John P. Sorensen

Todd & Sue Ryker

In memory of Mrs. Howard E. Warren

G. Raymond Nelsen

(EGG—Continued from page 65)

perfect condition without a trace of egg residue.

Because of the hot, dry weather, the grass in the area was dead—a solid sheet of brown. This made it easy to locate the remains of all four eggs. One egg was still intact while the others had holes or were completely shattered. It appeared to me that the eggs were broken by contact with the ground when they were dropped rather than by the bird's beak. The eggs were found from 15 feet (4.6 m) up to almost

25 feet (7.6 m) away from the bluebird box. During a summer with more normal rainfall, the eggs would have been difficult to locate in green grass.

There was a happy ending to this story, however, for the female bluebird laid four more eggs. On 7 September four bluebirds fledged which made a total of 16 from that box during the summer. The fledging date is the latest I have recorded in my 23 years of bluebird monitoring. ■

1720 Evergreen Court
Heath, OH 43056

A Bird For All Seasons

Jeanne B. Patric

Our affair with bluebirds began on a late summer day in 1989 when we glimpsed four unfamiliar birds in our front yard. They moved erratically, flitting from bush to stub, then dropping briefly to the ground. Their wings and backs were blue, a pure deep hue which electrified the hazy morning. Their blue plumage and chestnut-rosy breasts were unmistakable. A small flock of bluebirds was visiting!

We had not seen this increasingly-rare species for many years. Once bluebirds were abundant in New England, but competition from European Starlings and House Sparrows along with the destruction of natural cavities had decreased their numbers. Our flock returned many times in late August and September; we saw them also in the fence row adjacent to our property. How, we wondered, could we encourage them to nest nearby?

The bird books we checked were emphatic—although later we learned that height and direction were much less rigid. Bluebird nest boxes should be placed five to seven feet above ground, must face south, and ideally border on pasture or grassland. Recommendations for size and shape showed variation, but all emphasized that the hole should be small enough to deter starlings. I began to shop for nesting boxes. I purchased one which was quite deep, with a small opening in the top, apparently simulating a fence post cavity. Designed with bluebird biology in mind, I thought, although I wondered about rain dripping in on tiny birds on a stormy day. Another, bought on a trip to Arkansas, proved an awkward piece of carry-on luggage on the plane trip home. This had a sloping roof, a front which could be easily opened, and a predator baffle with small strips of wood inside. "Guaranteed to bring them in," said the man from Fayetteville. A local purchase was slanted and designed to mount on a pole. Surely one would be

right!

The southern exposure was easy to fulfill. Our property is adjacent to a 100-acre turf farm, so the new nest boxes were located in the hedgerows along the turf. We erected the variously-designed houses in early spring, mindful that we had to monitor them every few days to discourage House Sparrows from nesting.

Bluebird couples arrived in March and busily inspected our boxes, flying from one to another to investigate. We were delighted. Our efforts to find the perfect nesting home would surely pay off. But, to our dismay, the bluebirds vanished, and the boxes remained empty through May and June.

Then, one morning in early July, we noted activity at the vacant swallow box twenty yards away from our dining room window. This box is plain and square, faces directly north, is ten feet off the ground in a pine tree, and does not border on grassland. Despite what appeared to be disadvantages, a pair of bluebirds was obviously settling in.

Bluebirds are placid, companionable birds with a cheery warble which sounds like "kir-a-lee, kir-a-lee." This pair seemed to delight in diving in and out of the box, exploring trees and shrubs in the vicinity, or merely resting, like living sapphires, in the pine tree. Together they carried dried weeds and grasses to the nest, and in the following week the female began incubation.

Throughout the long, hot summer days we would see her patiently sitting, little head peering out the opening, only occasionally leaving for food. We speculated that three or four bluish-white eggs were in her clutch. The male, a brighter blue than she, was always somewhere nearby, warbling encouragement or sometimes bringing a worm or cricket to his mate. Often an immature bird, which we assumed to be a youngster from a May or June

nesting, would join the adult. Incubation continued for several weeks. I had almost concluded that the eggs were sterile, when hatching took place.

Now came the excitement of watching the parents feed the babies. Nourishing the nestlings became a major task. We were totally surprised to see the third bird, the immature member of the group, join in bringing food to the young. In a few days two little steel-blue heads were peeping from the nest hole. When awake the tiny birds almost continually emitted a single plaintive cry of hunger. For two torrid summer weeks we would awaken to that insistent call which could be heard during most of the daylight hours. The birds were unperturbed by our activities and tolerated our presence. The nest box with its two noisy little inhabitants and their three brilliant blue attendants became a focal point for us.

Then the accident happened. One of the nestlings fell to the ground. Awkward, with big eyes and spiky grey-blue feathers, the baby stumbled and scrambled while the parents hovered anxiously. Sitting on our deck I watched, worried that the neighbor's cat might wander by. The adults fed the youngster as it rested in the grass. It gave its agitated cry, but the situation seemed hopeless.

I debated. Should I get a ladder and put the baby back? Finally I elected to take the risk; surely the creature would perish if left on the ground. So, up the ladder, into the box, the parents returned, and all seemed well.

Next afternoon saw a repetition of the incident. Having watched the baby flutter incompetent wings, we replaced it. On the following day a bird once more fell to the base of the tree. This time it began a remarkable attempt to climb the pine tree trunk. Picture a small bird, unable to fly, flapping its wings and proceeding up the broad tree trunk, holding on to the bark with tiny claws. Flutter, jump, struggle, hang on...only to lose its grasp and tumble back down. The bird tried this three times, and ultimately succeeded

in reaching the level of the box.

Unfortunately, there was no way the baby could negotiate passage from the tree to the smooth-sided nest box and, thus, finally reach the hole to its home. One last tumble and one more rescue. All was quiet for a long time. We surmised such heroic climbs demanded adequate recuperation.

Next day we found the two little bluebirds huddled together in a low pine tree. They could fly a little, from one low branch to another. Tree trunks attracted them, and they habitually clung to underhanging branches or sat close to the base of a tree. Their vulnerability seemed extreme the following afternoon when a heavy rainstorm drenched the foliage. I discovered the young ones clinging to the bottom of a large pine, dripping wet, and, I feared, easy prey for predators.

They survived. Daylight showed them finally flying, joining the adults in a colorful group, exploring the middle canopy of our backyard. In a few more days when their flying skills were better, the flock headed out across the turf to the woods that lie to the east of us. The birds remained around all summer, traveling from woods, to our place, and on to the fence row to the west. We saw no bluebirds during November and December.

January, however, found them back with us, investigating their old home, brilliant blue against the snow and evergreens. Since then we can usually find the flock, which now numbers nine, if we walk down to the fence row. Even on bitterly cold, windy days, if the sun is shining we expect to see them, busily gleaning sumac seeds or searching for dried berries on the elderberry bushes.

Recently, we have noted on several occasions that the birds are spending winter nights nestled together in some of our bird houses. Now we no longer remove our boxes in the fall, but rather clean and then replace them for winter shelters. Bluebirds are always welcome in our yard! ■

241 Dugway Bridge Rd.
West Kingston, RI 02892

Hooking Cavity Nesters

Roger W. Thompson

The April 1991 issue of *Sunset Magazine* contained an article about a man named Tony Koch who puts up several hundred nest boxes each year in his cherry orchards near Salem, Oregon. These boxes are hung from barbed wire

that Mr. Koch has strung through his orchards on 20 foot (6.1 m) poles. After reading this article, I devised a method of hanging nest boxes that some bluebirders may want to try.

First, I attached a hook to the

Figure 1. Nest Box with Hook Attached

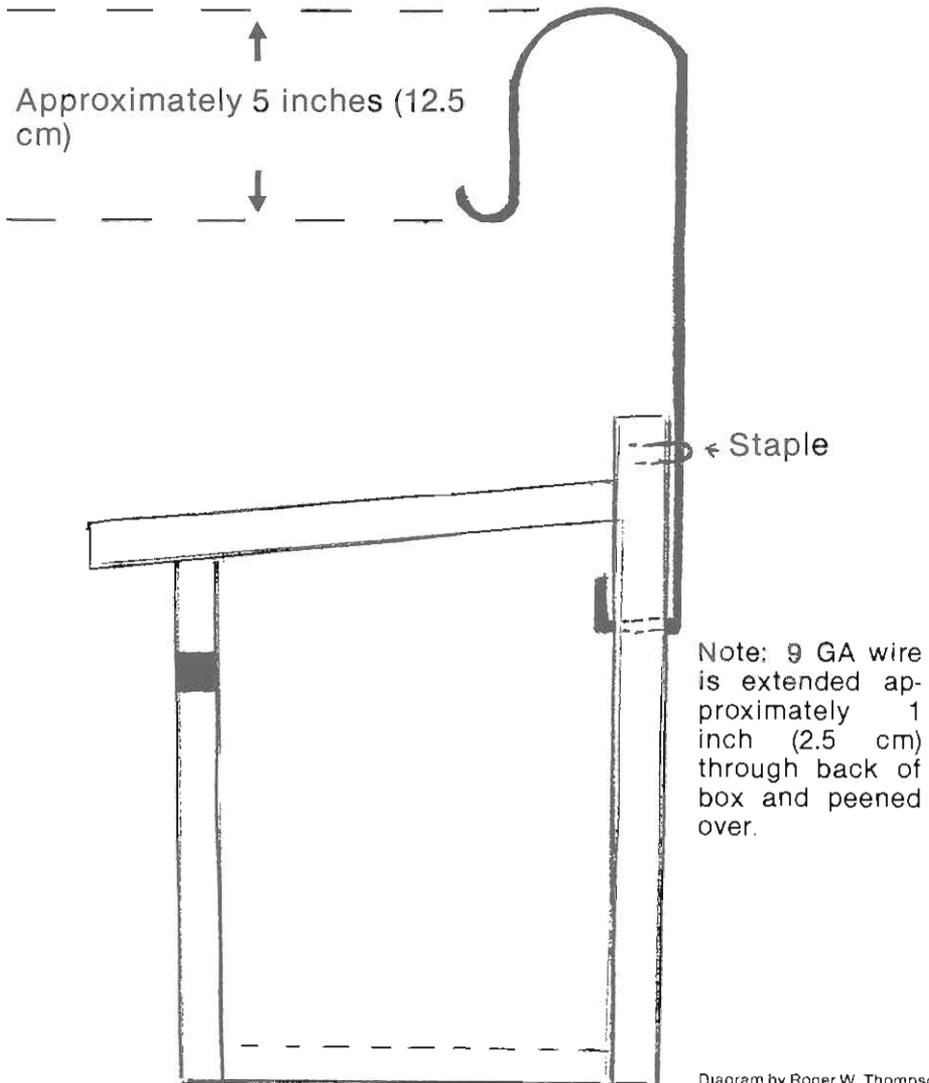


Diagram by Roger W. Thompson

back of each nest box using 9 GA galvanized wire. I then clamped a box to an aluminum extension pole. This box has no top and is large enough so that a nest box will fit inside of it. Using this pole, I can hang nest boxes as high as 18 feet (5.5 m). To take a hanging box down for inspection, one simply reaches up with the pole and unhooks the box. Loosen the extension pole and let it telescope gently until the nest box can be lifted out of the roofless carrier box.

On my five acres in southern Oregon, I had three nestings of bluebirds, two of these were in hanging boxes mounted about 15 feet (4.6 m) high. Chickadees and Tree Swallows also nested in hanging boxes. Numerous other boxes were available, mounted on posts, poles, and tree trunks. Birds seemed to prefer hanging boxes even though they were put up quite late in the nesting season.

Hanging boxes, using a hook, have a number of advantages:

1. There is reduced predation and vandalism.
2. Several boxes can be hung on one tree.
3. This method is safer than climbing ladders.
4. When I cleaned out the boxes in the fall, there were no insects in the hanging boxes while all of the boxes mounted on tree trunks were heavily infested with earwigs.
5. Nest boxes can be easily relocated or taken down for maintenance.

In this area, House Sparrows are a serious threat to cavity nesting birds. Whenever I find sparrows nesting in one of my boxes, I screw mount a small block of wood next to the entrance. At night I use a pole to turn the block of wood to cover the hole. The next morning I cover the box with a net onion sack, open the box and dispose of the sparrows. ■

1210 Gardner Way
Medford, OR 97504

(LITERATURE REVIEW—Continued from page 59)

species." (p. 3); "Few areas have been studied thoroughly...." (p. 3). Eggs have been described for only four species and the first larval stages have been described for only three species. The cue that attracts adult female bird blowflies to a nest has not been identified; odor-releasing events such as the hatching of eggs is suggested as a possibility. The authors have no reports or specimens of bird blowflies from several states with Eastern Bluebirds (e.g., Texas, Louisiana, Arkansas, Oklahoma, Florida). Bird blowflies are documented from most of the states and provinces in the ranges of Mountain and Western Bluebirds, although Nevada, Montana, and most provinces east of British Columbia have few records. I suspect that many of the

gaps in the range maps reflect a lack of observation and/or reporting rather than an absence of bird blowflies. Most of us non-entomologists will probably never be able to correctly identify the various species of bird blowflies (even with the aid of this book); however, we can collect larvae and pupae, rear adults, note dates, localities, and hosts, and pass these on to the specialists working in this area. ■

Entomological usage, as in the book title, is blow fly as two words. More general, as well as ornithological usage, is blowfly as a compound word as used in the review.

Dr. Pitts welcomes reviews from members. Readers should submit material to Dr. T. David Pitts, The University of Tennessee at Martin, Martin, TN 38238-5014.

QUESTION CORNER

Lawrence Zeleny



With a brood of four bluebirds, the adult female disappeared about May 28th, but the male worked hard feeding the nestlings during the next week. There were several cool, wet days during that period. On June 6th I did not see the male. I did notice a small bird (a wren?) enter the box and reappear. When I checked, I found four good-sized nestlings dead in the nest.

We found no sign of the adults. A day or so later a cat from one-quarter mile away appeared along our fence. The box was protected by a double thickness of board at the entrance and a metal guard on the post below.

Harper Follansbee
Fitzwilliam, New Hampshire

The most likely cause of the death of the bluebird nestlings in your nesting box would appear to be that both parent birds had died, possibly killed by the cat you mentioned. Without the parent birds to feed them, the nestlings would die rather quickly.

One of my boxes had four nestlings. A ten-day old bird disappeared from the nest. Could a nestling at the front of the box, eager for food, go up to the hole and out of the box in one motion when the parent arrived? The only predator that has ever caused problems in the area has been the House Sparrow. I think this disappearance happened in daylight.

Brian Miller
Fredericksburg, Virginia

It is very unlikely that a ten-day old nestling bluebird would accidentally

tumble out of the entrance hole of its nesting box. In the case you mentioned, the disappearance of the nestling was probably caused either by its being taken by some predator or by its death from some unknown cause. Dead nestlings are usually removed by the parent birds unless they are too large for them to handle.

Although I have had bluebird nesting boxes up for years, only last year did I begin to lose nestlings. I'm assuming it was blowfly larvae, but I'm not sure. I have rotenone powder but have hesitated to use it for fear of harming the babies. We had a cold night (about 32°) when one of the broods hatched. Would that have been enough to kill them? We also have some rainy weather here.

Valerie Vierk
Ravenna, Nebraska

Abnormally cold, wet weather early in the nesting season often causes the death of bluebird nestlings. This is probably what happened in the cases you described, whether or not you had blowfly infestation. This does not discourage the birds from starting over as soon as the weather improves.

If you did have blowfly infestation, you would have found blowfly puparia in the nests when you removed them. These are small brown oval structures about one-quarter of an inch long from which adult blowflies would eventually emerge. ■

The Merits of Monitoring

William C. Harris

We often read or hear about various ways we can help the bluebird, but we don't always hear about the results of experiments. The following is a success story on our 60 box bluebird trail from the 1990 breeding season.

On our far-flung trail, we have several boxes in isolated old hayfields. One field has been the scene of successful bluebird fledgings for the last three years. This trail is monitored by a woman named Terry and her spouse.

During one of her weekly reports to me by phone, Terry said nestling bluebirds in a hayfield box didn't look too peppy. Although nearly feathered, she said the feathering seemed skimpy, the skin looked too yellowish, and their eyes seemed lackluster. I told her I would check the situation immediately.

When I opened the box, everything was just as she had described it. I gently raised birds and nest a few inches and my fears were confirmed: blowflies! Killing all that were visible, I then raised the upper one-third of the nest (birds and all) and pulled out the remaining two-thirds. I added a handful of dried grass as a nest base to compensate for the missing section. After closing the box, I went to get some items from my shop. I cut a 6 1/2 x 6 1/2 inch piece of 1/4 inch wire mesh. I then made a 1 1/2 inch diagonal cut on each corner with cutting snips. Folding down all four sides I then had a small table with one-inch legs. Then, grabbing a small bag of rotenone powder I headed for the field.

The bluebird parents were in the vicinity so that was a plus. I quickly opened the box and raised the nest again—birds and all. I applied some rotenone to the floor and then slid in the wire mesh table. I gently lowered the nest, checking that the nest was about the same depth as before.

Terry checked the box a little more often, even though it meant going out of her way quite a bit. At first there

appeared to be no change. Then came her phone call saying that things were looking up. The birds did look better; the parents were feeding the young as if to make up for lost time. A later report found the birds feathering out well, and then one day they fledged and were gone!

We will always believe that, without intervention, these birds were doomed. Another day or two and the parents would surely have given up trying to feed them. The fact that there were only three nestlings may have been a saving factor. Had there been four or more we might not have saved this clutch.

Experiences like this one reinforce the necessity for monitoring bluebird trails. Believe it or not, some people are still reluctant to open a bird box and look inside it. Even cleaning out the box after the young have fledged is considered by many to be risky. We now know an emptied box seems to promote faster nest rebuilding. More than that, think of the possible parasites that old used nest may contain.

Place the used nest in a bag, and carry it far away from the nest box. ■

15 Clovercrest Dr.
Nashua, NH

(COMPETITION—from page 58)

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12554 Indian Hill Dr.
Sykesville, MD 21784



Photograph by Hubert A. Brandenburg

A female Eastern Bluebird brings food to her third brood in a nesting box in Sykesville, Maryland.

NABS SLIDE SHOW

The NABS slide show is available for rental at \$10.00 or purchase at \$55.00. The show consists of 141 collated, cardboard-framed 35 mm slides and a printed script (no slide tray). If a cassette narration is desired add \$5.00 to the purchase price.

To rent or purchase the bluebird slide show, write to the following address: NABS Slides, Box 6295, Silver Spring, MD 20916-6295. Please allow a month for delivery and, if possible, specify several dates.

BLUEBIRD EXPRESS

SIALIA welcomes the correspondence of its membership. Bluebird Express should become a forum for all who are interested in communicating their ideas and actions concerning bluebird conservation. We will attempt to publish a wide range of views in a responsible manner. Keep your letters coming!



Dear Editor:

The birds and our monitors persevered during a hot, dry summer to set a Codorus State Park record 210 bluebirds fledged in 1991. We also fledged 126 House Wrens, 300 Tree Swallows, and 9 Carolina Chickadees. A new problem this year was the use of fishing line by bluebirds and Tree Swallows as nesting material. One bluebird was found entangled in the line inside a box and freed. One Tree Swallow even incorporated a shiny lure into its nest.

Against my wishes, a monitor greased one of my nesting box poles. I am against this practice because I see it as pollution. I feel that rain washes the grease from the post down into the ground. The birds in this box died which could have been caused by pesticide spraying of a nearby field. I would like to know if any other monitors feel as I do about greasing poles, or if they feel I am being overly picky about this. Reading about oil spills and all the oil dumped by "do-it-yourself" mechanics led me to this belief.

Karen Lippy
432 Penn St.
Hanover, PA 17331

Dear Editor:

I am winning the battle against blowflies. I have been using diatomaceous earth (in this area Fossil Flower

powder) since 1975 to kill these pests.

Can a House Wren remove a bluebird nest from beneath nestlings? I was checking box 182 in Adjala township on June 4th and found one egg of the second brood. On July 10th I found four young, fully grown. They were healthy and strong, but there was no nest under them! There was no sign that a person had swept out the nest with a brush. Many times in July I have come across white feathers on the ground. This is the work of a wren. It removes part of the nest of Tree Swallows, then adds its own black twigs. Could a wren have been at work lifting out blades of grass from under the young bluebirds while the parent bluebirds were feeding and removing fecal sacs? Advice or comment from bluebirders is welcome.

L.A. Smith
65 Sympatica Crescent, Apt. 408
Brantford, Ontario
Canada N3P 1M7

Dear Editor:

In 1991 my Amity Lake Bluebird Trail in Allegany County fledged 138 Eastern Bluebirds from 166 eggs hatched. I monitor approximately 150 boxes. In addition to bluebirds, these boxes fledged the following species: Tree Swallows, House Wrens, Tufted Titmice, Black-capped Chickadees, Purple Martins, Wood Ducks, Hooded Mergansers, and Great Crested Flycatchers.

Sialia, Spring 1992

This year boxes with the 7-inch roof extension plus a raccoon guard proved 'coon-safe!

Vivian Mills Pitzrick
Amity Lake, Rt. 1
Belmont, NY 14813

Dear Editor:

A total of 130 bluebirds fledged from my 67 boxes in 1991. Each nesting box is equipped with a wren guard. I am sold on the wren guards, not only to help keep the wrens out, but also to protect the entrance hole from being chewed out by "varmints." I have had none of that since using the wren guards. The wren guards are not 100% wren-proof, however. The wrens are now using shorter sticks. They are more active when the box is placed near a brushy thicket.

The damage I had to my boxes was from livestock and unknown causes. I paint the underside of the roof with a turpentine-axle grease mixture to discourage hornets. The post and barbed wire are painted to keep ants out. The hornets are now attaching their nests on the inside walls of the nesting box down closer to the floor.

James E. Fitzgerald
2910 SW Arvonita Pl.
Topeka, KS 66614

Dear Editor:

I work for the Maryland Department of Natural Resources at the Millington Wildlife Management Area in Kent County. During the summer of 1989, we started a bluebird box program with youth groups in our district which includes Kent, Queen Anne's and Cecil Counties. The program includes presenting a talk about bluebirds, building nesting boxes from kits, erecting the boxes, and then maintaining and monitoring them.

Each nesting box kit contains pre-cut and pre-drilled wood, nails, and screws to make one complete bluebird box. In each kit we put an information sheet about bluebirds, a NABS pam-

phlet, and a monitoring form which is to be completed and returned to our office at the end of the season. The materials for the kits have been made available through the tax checkoff program for the Chesapeake Bay and Endangered Species Fund. To date, approximately 450 kits have been given out. Some of the labor to build the kits has been provided by the rock fish compensation program (when in effect); last year the Kent County and the Queen Anne's County High School industrial arts classes provided the labor.

The program was initiated with the intention of including as many youth groups, adult organizations, and state agencies as possible. The whole process involved in the program takes each youth (or adult) on a journey of education and awareness. It symbolizes what not just one individual, but many, can accomplish.

Barbara Ford
Millington WMA
Rt. 1, Box 552
Massey, MD 21650

Dear Editor:

We have been bluebird enthusiasts for three years and enjoy receiving *Sialia*. We had been having troubles with raccoons. My husband has come up with a round wire predator guard which has eliminated raccoons raiding boxes containing bluebirds. We started using it this year and it has proven successful. We would be happy to send a copy of the construction diagram to anyone interested if they would send us a stamped, self-addressed envelope.

Maurine and Amy Polivka
12906 Ohio Circle
Omaha, NE 68164

Bluebird Tales

Due to the extended illness and death of her father, Executive Director Mary D. Janetatos's regular column, "Bluebird Tales," will not appear in this issue.

Bluebirder Jim Walters of Iowa City, Iowa, wrote to us concerning the raccoon problem. (See his letter below.) Raccoons have given many of us problems on our trails and with the raccoon population continually growing, we will face more problems. He brings up a valid point that nesting boxes should have their own pole and never be mounted in fence rows. Some bluebirders, however, use fence rows with good success. The raccoon research conducted by Research Chairman Kevin Berner and his students found that a wooden predator guard placed over the entrance hole did not prevent a raccoon from reaching the bottom of the nesting box. Should the guard be left off of nesting box plans in the future? We would like to have your comments on the recommendations in Mr. Walters' letter.

—Sadie Dorber, Pres.

Bluebird Boxes Should Never Be Mounted Along Fence Rows

Dear Friends:

I have enclosed an article from the 19 July 1991 Cedar Rapids Gazette by Bill Hasek. While I haven't met Mr. Hasek, my own experience as a bluebirder over the last few years leads me to exactly the same conclusion: nest boxes should be mounted on their own poles and should never be mounted in fence rows. Further, raccoon guards, which keep raccoons off the box, are essential features of the properly-designed and mounted box. (Guards that allow predators on top of the nest box, but deny them access to the nest are not adequate to the task of protecting the nesting cycle.)

I have been a bluebirder for more than 30 years and a NABS member nearly since the beginning. I have also recently helped to organize the Johnson County Songbird Project, a non-profit local group which seeks to protect birds and habitat. Using the NABS slide show, I have helped present numerous bluebird programs over the last few months.

As I have tried to explain my experiences and ideas as a bluebirder, both to the experienced and to the novice, I've come to take my responsibilities somewhat more seriously. If what we are doing is *for the bluebirds* and not simply for the entertainment of bluebirders, then we must be clear about effects and consequences of everything we do. We should not slide from facing reality or shy away from criticizing others who fail to. I feel we are all somewhat guilty of this.

I think what I am asking for is a NABS-led moratorium on the use of fence-mounted bluebird boxes and "hole-only" raccoon guards. I don't know if there are any areas on the continent that are entirely free of raccoons or other predators, but I do know that in Iowa a fence-mounted box is the equivalent of putting out lunch for raccoons.

What has kept us from facing this? Failure to monitor seriously? Unwillingness to bear the effort and expense of pole mounting? Inertia?

At the very least NABS could initiate a front page debate on this question in *Sialla*. That could let it be roundly debated and open it up for all serious bluebirders, something that needs to happen.

Sincerely,



Jim Walters, Pres.
Johnson County Songbird Project

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Prepared for *Sialia* by Nancy E. MacClintock-Indexes

FIFTEENTH ANNUAL MEETING OF THE NORTH AMERICAN BLUEBIRD SOCIETY

The 15th annual meeting of the North American Bluebird Society will be held in Minneapolis, Minnesota, September 11-13, 1992.

Hosts for the meeting are the Minnesota Recovery Program and the Minnesota Department of Natural Resources Non-game Program.

Plan to spend a weekend in America's Heartland at the 15th annual meeting. A series of special events are planned.

- **Papers presented by well-known ornithologists and biologists**
- **Discussions by local authorities on a wide range of topics relating to cavity nesters**
- **Saturday evening banquet with special program**
- **A cruise on the Mississippi River aboard the historic Jonathan Padelford, a modernized sternwheeler, to enjoy fall scenery, local history, and wildlife**
- **Field trip to Minnesota River Valley National Wildlife Refuge**
- **Bluebird trail tour at Hyland Regional Park**
- **Opportunities to discuss bluebirds morning, noon and night**

Registration materials are included with this issue. Note the August 10th deadline. Direct registration and any questions to the following address:

1992 NABS Conference
Bluebird Recovery Program
Box 3801
Minneapolis, MN 55403

Blue Angels

We waited and watched for two springs;
Our one-eyed bird houses stared blankly back.
Tree Swallows tried to console us with gifts
of white feathers.
But now each new spring brings blue tears of joy!
The blue angels bless our land.
Thank you people of the states who sustain our bluebirds,
While we wait in the snow
For our love letters from the south.

—Lorraine Pierias

Bluebirds

The warm March winds
lightly touch my cheek
I wonder—
is it time?

Carefully I clean
bluebird boxes—
I wait.

Listening for songs
floating on small blue wings
I wonder—
will the sky sing?

Perched on a tall twig
a fluff of feathers
I know—
Welcome bluebirds!

—Delores Kabza

Art Credits

Jon E. Boone: 42, 74
Suzanne Pennell: 66, 71

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(Continued on page 80)

Founded in 1978, THE NORTH AMERICAN BLUEBIRD SOCIETY is an incorporated non-profit organization determined to increase the populations of the three species of bluebirds on this continent. Inasmuch as the populations of these birds have diminished due to the maladroit actions of human beings, as well as natural disasters, the primary objective of the Society is to educate all who will listen about the importance of preserving these singular creatures in their native environment.

Toward this end, the Society will work, within the bounds of effective conservation, to study those obstacles impeding bluebird recovery; to publish results of those studies; to promote ideas and actions which might reduce the effect of those obstacles; and to obtain a more complete knowledge about bluebird ecology, in the hope of learning more about the ecology of humankind.

Membership: Student (under 21) \$10.00; Senior (over 60) \$10.00; Regular \$15; Sustaining \$30; Supporting \$50; Contributing \$100; Corporate \$100; Donor \$250; Life \$500. Add \$2 per year for Canada and Mexico and \$3 per year for other countries (Surface mail). U.S. funds only, please. Amounts over \$6 are tax deductible.

Address:
North American Bluebird Society
Box 6295
Silver Spring, MD 20916-6295

