Nest Re-Use by Blackbirds — The Way for Safe Breeding?

Author: Wysocki, Dariusz

Source: Acta Ornithologica, 39(2) : 164-168

Published By: Museum and Institute of Zoology, Polish Academy of Sciences

URL: https://doi.org/10.3161/068.039.0202

ACTA ORNITHOLOGICA
Vol. 39 (2004) No. 2

Nest re-use by Blackbirds — the way for safe breeding?

Dariusz Wysocki

Department of Vertebrate Anatomy and Zoology, University of Szczecin, Wąska 13, 71–412 Szczecin, POLAND, e-mail: darekw@univ.szczecin.pl

Wysocki D. 2004. Nest re-use by Blackbirds — the way for safe breeding? Acta Ornithol. 39: 164–168.

Abstract. The biology of individually colour-ringed European Blackbirds inhabiting two city parks in Szczecin (NW Poland) was studied in 1997–2003. In each park one to three observers watched the behaviour of Blackbirds every other day from dawn till afternoon (6–8 h a day); in this way almost all of their nests were discovered. 35 cases were recorded where pairs re-used their own nests, as well as two cases where the nest of another Blackbird pair and one Fieldfare nest were re-used. In 33 out of 81 cases observed, the re-use occurred after the brood had been successfully reared, while in two cases out of 378, female Blackbirds initiated the second breeding attempt in the same nest after the loss of the first one. The re-used nests were better concealed (80 ± 19% and 69 ± 18%, respectively) and had been built at greater heights than those abandoned after breeding (9.0 ± 5.0 m and 6.5 ± 4.2 m, respectively). No shortening of the interval between successive clutches was noted in the case of nest re-use (re-used nests 36.8 ± 4.9 days, newly-built nests 37.7 ± 8.0). The more and more frequent re-use of nests where breeding had been successful, their better concealment and higher sites, and also the lack of any differences in the intervals between successive clutches of pairs occupying old nests and those building new ones before the next breeding attempt, suggest that in the investigated population the basic reason for nest re-use was the insufficient number of safe nesting sites.

Key words: Blackbird, *Turdus merula*, nest re-use, predation, predator avoidance

Received — May 2004, accepted — Nov. 2004

INTRODUCTION

Nest re-use is one of methods used by various bird species to minimize or avoid the cost of nest building (see: Hansell 2000 for review). Unlike colonially-nesting birds or cavity-nesters, most passerines build open nests and use them only for one clutch (Skutch 1976, Briskie & Sealy 1988) even though many nests are so solidly constructed that they could be re-used in the given breeding season and sometimes even in following years. Regarding the last case, according to Cavitt et al. (1999), three hypotheses have been proposed to explain the construction of durable nests: 1) the re-use of a nest permits the parents to utilize their time and energy more efficiently (Weeks 1978), 2) the aggregation of old nests can impede the finding of re-used nests by predators (Watts 1987), 3) old nests can make it easier to find a nesting site (Eckermann et al. 1990). The re-use of nests by birds in the same breeding season can also be due to the economy of expenditure on the part of parents, but another reason could be that no other adequate nesting sites are available.

The Blackbird *Turdus merula* usually builds new nests for each brood. However, data reported in literature documents frequent re-use of old nests, both in the breeding season in which the nest was built and in successive seasons (Lack & Light 1950, Bawtree 1952, Rhodes & Bush 1955, McBride 1978, a review in Stephan 1985).

Nest re-use by species that breed in colonies (Shields 1984), tree hollows (Newton 1994, Blem et al. 1999) or that build open nests (e.g. Curson et al. 1996, Bergin 1997, Antonov & Atanasova 2003) has been studied, but relatively few authors have investigated the reasons for nest re-use in the same breeding season (Curson et al. 1996). This study presents the frequency of this phenomenon and tests hypotheses concerning the reasons for the repeated use of a nest by Blackbirds in the given breeding season. If the basic reason for nest re-use in the same breeding season is the economy of energy expenditure, then we would predict that the interval between successive breeding of pairs that re-use their own nests or the nests of others would decrease. However, if the reason for nest re-use is that safe nesting sites are scarce (predator avoidance hypothesis), more frequent re-use of nests that produced fledglings would be expected, and breeding success should be lower in newly built nests than in re-used nests. Moreover, in areas of intense predation, nest re-use after successful breeding should be more frequent than in locations with lower predation pressure.

STUDY AREA

The observations were carried out in 1997–2003 in two urban parks of Szczecin (NW Poland): the Zeromski Park (Park Z — 21.9 ha) and the Kownas Park (Park K — 16 ha). Park Z located centrally in the city is subjected to constant human use and is surrounded by buildings and streets on all sides. The canopy consists of mostly deciduous growth aged 100–200 years. The understory is very poor. The shrubs occupying 7% of the park area chiefly consist of the Yew *Taxus baccata* and deciduous shrubs. The densities of the European Blackbird recorded in the area in 1997 to 2003 were 0.95, 1.2, 1.4, 2.1, 2.0, 2.5 and 2.5 pairs/ha, respectively. Females started as many as six clutches but were able to successfully raise as few as three clutches per season, i.e. from late March till late July. Breeding pairs averaged 2.0 fledglings per year. The predators in the park include the House Marten *Martes foina*, domestic cat *Felis catus*, domestic dog *Canis familiaris*, Hooded Crow *Corvus corone*, Magpie *Pica pica*, Jay *Garrulus glandarius*, Jackdaw *Corvus monedul*a, Kestrel *Falco tinnunculus*, and Sparrowhawk *Accipter nisus*.

Park K is a part of a large green that merges smoothly with suburban woodlands. The intensity of pedestrian traffic is much lower than that in Park Z. The canopy is formed by deciduous (60%) and coniferous (40%) trees. The understory is very poor; the shrubs occupy 9% of the park area and consist almost entirely of Yew. The study area was described in detail by Wysocki *et al.* (2004). The densities of the European Blackbird recorded in the park from 1997 to 2003 were: 1.1, 1.2, 1.1, 1.3, 1.3, 1.0 and 1.1 pairs/hectare, respectively. Breeding pairs averaged 0.6 fledglings per year. The predators identified in the park included House Marten, domestic cat, domestic dog, Squirrel *Sciurus vulgaris*, Hooded Crow, Magpie, Jay, Kestrel, Sparrowhawk, and Tawny Owl *Strix aluco*.

Over the course of the study, the proportion of individually marked birds in both parks rose from about 70% in 1997 to about 80% in 1998 and to over 90% in 1999 and later years.

METHODS

In each park, observers watched the behaviour of Blackbirds every other day from dawn until afternoon (6–8 h a day). Almost 100% of the nests were discovered. Since most nests were built 7 m or more above the ground, it was not possible to determine the time of the laying of the first egg. I therefore assumed that the female began incubation after the third egg had been laid (a day + 2 of the breeding cycle). Statistical treatment of nest parameters was based on pentades. Conformity to the normal distribution was tested with the χ^2 test. For each nest, we measured four parameters: 1) the height of the nest site (up to 6 m exact to 10 cm; in the case of higher positions, the altitude was estimated to 0.5 m), 2) the plant type where the nest was built (coniferous shrub, deciduous shrub, coniferous tree, or deciduous tree), 3) the place where the nest was built (on a branch, at the trunk, in the trunk bifurcation and in a hollow) and 4) the degree of visibility of the nest exact to 10%. Since most nests were situated too high to measure their visibility to a more exact degree, the investigators stopped trying to describe them in detail (following the method of Cresswell (1997) or Gregoire et al. (2003)). For nests built up to 4 m above the ground, we measured the visibility of the nest and of the incubating female from four sides, beginning with the direction from which the nest was best visible at a distance of 4 m; the result was an average of four measurements. In the case of nests situated more than 4 m above the ground, we estimated nest visibility on the basis of vegetation development in the tree in which the nest was situated. Nests built on tree trunks were visible from three sides, though hidden entirely from the fourth view by the tree trunk. These nests were, at most, 30%–40% hidden. The best sheltered were those built in coniferous trees and shrubs, which were usually completely hidden.

Each bird's age was determined from the contrast in wing plumage (Svensson 1992). The proportion of young males (in their first breeding season) in the studied population in the different years of the study ranged from 27% to 50%; that of females ranged from 16% to 43%. The oldest birds (aged 6 years and more) made up 0–13% (males) and 0–10% (females) of the breeding birds (Wysocki 2004).

RESULTS

In total 35 cases of nest re-use were recorded. Most frequently (91.4%), birds used their own nest from the previous breeding attempt, but we also observed re-use of a nest of another pair of Blackbirds (5.7%) or a nest of Fieldfares *Turdus pilaris* (2.9%). In one case, the same pair used the same nest for four successive years. A total of seven out of 11 clutches (all successful) occurred in the same tree hollow. This nest was quite visible yet inaccessible to corvids. Meanwhile, the female tried to breed in four other places (in one place successfully) but each of these clutches was lost and she returned to the old cavity. After she died, another female had one successful brood in this place and attempted another, but damage to the tree made it possible for Magpies to plunder the clutch. Apart from this case, no re-use of an old nest in the next breeding season was observed even though the nests in hollows appeared to be suitable for re-use.

In Park Z, no statistically significant differences were found among years in the frequency of nest re-use; or among years with low (1997–1999, 43%, n = 30) or high (2000–2003, 35%, n = 43, $\chi^2 = 0.53$, df = 1, p = 0.46) densities of the Blackbird.

In 33 cases, nest re-use occurred after successful raising of fledglings. Apart from all cases when the successful breeding was the last attempt of a given pair in the current season, as many as 40% (n = 82) of successful nests were used a second time. Only twice (0.4%; n = 523) did females re-use previously unsuccessful nests ($\chi^2 = 207.07$, df = 1, p<0.0001). Nests in bifurcated tree trunks were re-used less frequently (23%, n = 22) than nests built on branches (50%, n = 20), at the trunk (43%, n = 23) or in hollows (50%, n = 16). The difference for nest re-use between sites in bifurcate tree trunks and undivided trunks was statistically significant ($\chi^2 = 4.06$, df = 1, p = 0.04). No differences were found in the frequency of repeated nesting in the same nest between females in their first breeding season and females in at least their second breeding season (re-used nests: young females 9%, old females 91%, n = 23, newly built nests — young females 15%, old females 85%, n = 41, $\chi^2 = 0.48$, df = 1, p = 0.49). In Park K, nests from which fledglings emerged were re-used more frequently than were those in Park Z but the difference was statistically non-significant (56%, n = 9 and 38%, n = 73, Fisher exact test, p = 0.26). In the subsample of successful nests (n = 82), nests that were subsequently re-used (n = 33) were better hidden and located higher than nests that were abandoned after the young fledged. No shortening of the interval between successive breeding attempts was observed in the case of nest re-use (Table 1).

The number of fledglings reared from the first clutch in a nest that was later re-used and a nest that was abandoned after the first clutch was similar (3.0 ± 1.0, n = 33 and 2.9 ± 1.3, n = 49, respectively; test t, t = 0.35, p = 0.55). In the second clutch, the number of fledglings produced from re-used nests (48% breeding success) was not significantly higher than the number of fledglings produced from new nests (33%, $\chi^2 = 2.08$, df = 1, p = 0.15), also the number of fledglings reared in re-used nests was similar in comparison with the number from newly built nests (respectively: 1.6 ± 1.8, n = 33 and 0.9 ± 1.4, n = 49, Mann-Whitney U test, Z = 1.62, p = 0.10). Among pairs that reared two successful broods in the same nest (n = 16), the number of fledglings produced was similar in both breeding attempts (clutch I: 3.2 ± 1.1, clutch II: 3.2 ± 1.0, test t for matched pairs, t = 0.22, p = 0.83).

Table 1. Characteristic (x ± SD) of successful nests: re-used vs. abandoned after fledging of young (test t). Interval — interval between successive breeding attempts.

	Abandoned nests N = 49	Re-used nests N = 33	t	p
Hiding (%)	69 ± 18	80 ± 19	2.68	0.008
Height (m)	6.5 ± 4.2	9.0 ± 5.0	2.48	0.02
Interval (days)	37.7 ± 8.0	35.8 ± 4.9	1.22	0.18

DISCUSSION

Taking over the nest of another bird or using second-hand nests are quite common strategies to save the cost of nest building (see: Hansell 2000 for review) but this behaviour is most frequently observed in species nesting in hollows and domed nests (Lindell 1996). Little Swifts *Apus affinis* frequently take over the nest of conspecifics and, when they do, they show conspecific infanticide. For this species, there are substantial costs of nest building (4.6 months for young pairs and 1.8 months for mature pairs (Hotta 1994)). The reasons for re-using a nest in the same breeding season by birds breeding in open nests whose construction does not necessitate selection of special sites or is extremely labour-consuming, have not been ascertained.

The cases of nest re-use by Blackbirds for successive clutches in a given season and in successive breeding seasons were described in the literature (Lack & Light 1950, Bawtree 1952, Rhodes & Bush 1955, McBride 1978, see a review in Stephan 1985). As both Lack & Light (1950) and Bawtree (1952) stress, if a nest is used for more than one breeding season, it is important that the nest site can ensure shelter against precipitation and preserve its good condition during the autumn-winter period. As described in the present work, the one nest used for successive years was built in a rotten trunk, so neither precipitation nor wind could cause damage. In the investigated population, the observed case of a Blackbird using a Fieldfare nest abandoned after the loss of the Fieldfare clutch is not isolated. Cohen (1952) recorded a Blackbird taking over a nest built by a Song Thrush *Turdus philomelos* after the Song Thrush had cased using the nest. However, the frequency of nest re-use has not yet been reported, and neither the proximate advantages of this behaviour in Blackbird has not been determined.

According to Martin (1992) the importance of nest predation to reproductive strategies depends on the extent that predation influences reproductive success and the extent to which probability of predation can be modified. The observed differences in the frequency of nest re-use between nests built in different sites may indicate lower safety of nests in bifurcate trunks. However, the higher breeding success in nests located at the trunk or in a bifurcation compared to these built on branches does not support this thesis (Wysocki unpubl.). No differences in the number of fledglings were demonstrated between the first and the second successful clutch in the same nest, indicating that, unlike swallows (e.g. de Lope & Møller 1993, Møller 1994), the impact of parasites on the second brood in the same nest was not significant in the case of Blackbird. Blackbird nests are unlined so transfer of parasites may be less likely.

Fairly significant losses in hatches observed in the Blackbird population nesting in the primaeval forest of Białowieża (68%, Tomiałojć 1994) and also low costs of repeated clutch in the same nest found in the course of the present research show that the re-use of the same nest can be an old measure of adaptation to the severe impact of predators in the primaeval forest. In Bialowieża, sporadic observations of repeated use of nests by Blackbirds (Tomiałojć L., pers. comm.) could have resulted from the pronounced timidity of forest populations which, after successfully raising the brood, abandon their nests found by researchers.

My data falsify the expenditure economy hypothesis. There are no statistically significant differences in the time of the successive egg laying between females building new nests and these using old ones. The data I obtained best support the predator avoidance hypothesis. The more frequent re-use of nests after successful breeding (thus — of safe nests), the fact that re-used nests were better sheltered and situated at higher sites than the nests abandoned after breeding — all point to the conclusion that nest re-use is a predator avoidance strategy. In most Blackbird populations that have been studied, the concealment of the nest is the most important determinant of successful breeding (Cresswell 1997, Gregoire et al. 2003). In another study, Blackbirds in urban parks that built nests at higher sites had better breeding success than did those with nests built at lower sites (Ludwig et al. 1995). In the parks included in this study, breeding success did not depend on the height of the nest site (Wysocki, unpubl.) but low-lying nests were more frequently abandoned and every year one to three nesting females in low-lying nests were killed by cats or martens. It seems that the reduced accessibility to predators and better shelter afforded by re-used nests ensure greater breeding success than do new nests. We found considerable though statistically insignificant differences between the parks in the frequency of nest re-use after successful breeding. The lack of statistical significance is probably due to the extremely small sample in park K (during the 7-year research period, only nine pairs were observed initiating second nests after the fledglings left the nest).

ACKNOWLEDGEMENTS

I would like to thank Konrad Hałupka, Tomasz Mazgajski and Piotr Tryjanowski for constructive criticism of an early draft of the manuscript, Sebastian Guenztel, Anna Durka, Ilona Młynarczyk and Olimpia Sosnkowska for helping in the field. We appreciate the improvements in English usage made by Ellen Paul through the Association of Field Ornithologists' program of editorial assistance.

REFERENCES

Antonov A., Atanasova D. 2003. Re-use of old nests versus the construction of new ones in the Magpie *Pica pica* in the city of Sofia (Bulgaria). Acta Ornithol. 38: 1–4.

Bawtree R. F. 1952. Blackbirds nest in use six times in three successive seasons. Brit. Birds 45: 330.

Bergin T. M. 1997. Nest reuse by Western Kingbirds. Wilson Bull. 109: 735–737.

Blem C. R., Blem L. B., Berlinghoff L. S. 1999. Old nests in Prothonotary Warbler nest boxes: Effects on reproductive performance. J. Field Ornithol. 70: 95–100.

Briskie J. V., Sealy S. G. 1988. Nest re-use and egg burial in the Least Flycatcher, *Empidonax minimus*. Can. Field. Nat. 102: 729–731.

Cavitt J. F., Paerse A. T., Miller T. A. 1999. Brown Thrasher nest reuse: a timing saving resource, protection from search-strategy predators, or cues for nest-site selection? Condor 101: 859–862.

Cohen E. 1952. Blackbird using a Song-Thrush's nest of the same season. Brit. Birds 45: 367.

Cresswell W. 1997. Nest predation: The relative effects of nest characteristics, clutch size and parental behaviour. Anim. Behav. 53: 93–103.

Curson D. R., Goguen Ch. B., Mathews N. E. 1996. Nest-site reuse in the Western Wood-pewee. Wilson Bull. 108: 378–380.

Eckerman W. J., Beletsky L. D., Orians G. H., Johnsen T., Sharbaugh S., D'Antonio C. 1990. Old nests as a cues for nesting-site selection: an experimental test with Red-winged Blackbirds. Condor 92: 113–117.

Gregoire A., Garnier S., Dreano N., Faivre B. 2003. Nest predation in Blackbirds (*Turdus merula*) and the influence of nest characteristics. Ornis Fennica 80: 1–10.

Hansell M. 2000. Bird Nests and Construction Behaviour. Cambridge Univ. Press.

Hotta M. 1994. Infanticide in little swifts taking over costly nests. Anim. Behav. 47: 491–493.

Lack D., Light W. 1950. Blackbirds using old nests and the same nest site in successive seasons. Brit. Birds 43: 404.

Lindell C. 1996. Patterns of nest usurpation: when should species converge on nest niches? Condor 98: 464–473.

de Lope F., Møller A. P. 1993. Effects of ectoparasites on reproduction of their swallow hosts: a cost of being multi-brooded. Oikos 67: 557–562.

Ludvig E., Vanicsek L., Török J., Csörgö T. 1995. The effect of nest-hight on the seasonal pattern of breeding success in blackbirds *Turdus merula*. Ardea 83: 411–418.

Martin T. E. 1992. Interaction of nest predation and food limitation in reproductive strategies. Current Ornithol. 9: 163–197.

McBride H. C. A. 1978. Repeated re-use of a nest by a blackbird. Bird Study 25: 188.

Møller A. P. 1994. Parasites as an environmental component of reproduction in birds as exemplified by the Swallow *Hirundo rustica*. Ardea 82: 161–172.

Newton I. 1994. The role of nest sites in limiting the number of hole-nesting birds: a review. Biol. Conserv. 70: 265–276.

Rhodes L. J., Bush C. W. 1955. Blackbird rearing four broods in same nest. Brit. Birds 48: 93–94.

Shields W. M. 1984. Fractors affecting nest and site fidelity in Adirondack barn swallows. Auk 101: 780–789.

Skutch A. F. 1976. Parent birds and their young. Univ. Texas Press, Austin, TX.

Stephan B. 1985. Die Amsel. Neue Brehm-Bucherei 95, Ziensen, Wittenberg Lutherstadt.

Svensson L. 1992. Identification Guide to European Passerines. Stockholm.

Tomiałojć L. 1994. Breeding ecology of the Blackbird *Turdus merula* studied in the primaeval forest of Białowieża (Poland). Part 2. Reproduction and mortality. Acta Ornithol. 29: 101–121.

Watts B. D. 1987. Old nest accumulation as a possible protection mechanism against search-strategy predators. Anim. Behav. 35: 1566–1568.

Weeks H. P. 1978. Clutch size variation in the eastern phoebe in Southern Indiana. Auk 95: 656–666.

Wysocki D. 2004. Age structure of urban population of Blackbird (*Turdus merula*) in Szczecin (NW Poland). Zoologica Poloniae, in press.

Wysocki D., Adamowicz J., Kościów R., Śmietana P. 2004. Breeding territory in urban population of European blackbird *Turdus merula*. Ornis Fennica 81: 1–12.

STRESZCZENIE

[Czy ponowne użytkowanie starych gniazd przez kosy może być sposobem unikania drapieżników?]

W latach 1997–2003 badano biologię indywidualnie oznakowanych ptaków w dwóch parkach Szczecina. W każdym z parków 1 do 3 osób obserwowało zachowanie ptaków od świtu do południa, ok. 6–8 godz. dziennie. W związku z tym niemalże 100% gniazd zostało znalezionych. Stwierdzono 35 przypadków, w których dana para powtórnie zajmowała swoje gniazdo, dwa przypadki powtórnego użycia gniazda budowanego przez inną samicę kosa, oraz jeden przypadek w którym kos zajął gniazdo wybudowane przez kwiczoła. W 33 z 81 stwierdzonych przypadków, powtórne zajęcie gniazda następowało po pomyślnym wyprowadzeniu lęgu. Natomiast tylko w 2 z 378 przypadków powtórne zajęcie nastąpiło mimo wcześniejszej straty lęgu w danym gnieździe. Gniazda powtórnie używane były lepiej ukryte (odpowiednio 80 ± 19% i 69 ± 18%) oraz położone były wyżej niż gniazda porzucane po wyprowadzeniu piskląt (odpowiednio 9.0 ± 5.0 m i 6.5 ± 4.2 m). Nie stwierdzono skrócenia okresu między kolejnymi lęgami u samic lęgnących się powtórnie w tym samym gnieździe (gniazda powtórnie używane 36.8 ± 4.9 dni, gniazda nowo budowane 37.7 ± 8.0). Częstsze powtórne zajmowanie gniazd z których zostały wyprowadzone pisklęta, ich lepsze ukrycie i usadowienie na większej wysokości, oraz brak różnic między kolejnymi lęgami między samicami, które powtórnie zajmowały i budowały na nowo gniazda przed kolejnym lęgiem, wskazuje, że podstawową przyczyną powtórnego zajmowania swojego gniazda w warunkach badanych parków jest brak bezpiecznych miejsc do gniazdowania.