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Urban Blackbirds (Turdus merula): from egg to independence

Bo Ebenman & Johnny Karlsson

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Young Blackbirds leave the nest about twelve days after hatching. They then need about five days before being able to fly. The families break up about three weeks after nest-leaving. In 1976, an urban population of individually marked Blackbirds was followed during the entire breeding season. Daily mortality rates of eggs and nestlings were about 4.3 and 2.5 %, respectively. The young were checked daily from nest-leaving until independence and the daily mortality rate was 1.9 %. This rate was considerably higher (4.2 %) during the first five days after nest-leaving than later on (about 1.4 % from day 6 to day 15 and zero during the remaining period).

Bo Ebenman and Johnny Karlsson, Dept. of Animal Ecology, Ecology Building, S-223 62 Lund, Sweden.

1. Introduction

It is often assumed that birds suffer a mortality peak immediately after the nest leaving. In nidicolous birds, detailed data exist for many species on survival rate during egg laying, incubation, and nestling periods. This stands in sharp contrast to the scarcity of information on the survival of fledglings from nest-leaving to independence. The reason for this is evident, i.e. it is most difficult to follow each member of a brood to be ascertain its fate.

Urban Blackbirds (*Turdus merula*) provide an excellent opportunity to study the fledgling survival up to independence since they live in an open habitat and do not fear man. In this paper we present data on the mortality during different juvenile stages within an urban population of Blackbirds.

2. Study area and methods

Our data derives from a long-term population study in the town of Lund, Southern Sweden. The Blackbird has belonged to the town's breeding fauna since the beginning of this century. The 8.5 ha study area mainly consists of public buildings surrounded by parks with a rather high frequency of old, tall trees. Over a ten-year period, between 15 and 20 pairs of Blackbirds held territories in this area. Nearly all birds were individually marked with colour rings. In 1976 all nests were found before laying started, and the nests were subsequently inspected daily. In this year we followed the survival of the young Blackbirds from leaving the nest up to independence. The broods were inspected daily, and any young missing on a given day was considered dead. This indirect evidence reflects mortality evidence, as birds did not disappear after their 15th day of life outside the nest. Soon after reaching independence many juveniles dispersed to nearby areas (short-distance juvenile dispersion), while other juveniles simultaneously entered the study area.

Young Blackbirds are cared for by one, or both, of the parents for a considerable time after nest-leaving. In case a second clutch is started, the male alone takes care of the young of the previous brood. A second clutch is often laid in the old (successful) nest, the first egg mostly being laid within a few days after the first brood left. If, for example, the first egg is laid after four days, the second clutch will hatch about 19 days after the nest-leaving ofthe first brood. This is the lower limit of the time needed for fledgling Blackbirds to reach independence.

During the whole study season in 1976 the Blackbirds produced 20 broods which left the nests. The four latest broods which would not have become independent until in the first half of September were not followed. Accordingly, the results presented here on the fledgling survival refer to the 16 earliest broods. The normal situation in the study population is that most of the production takes place late during the extended breeding season. In 1976, 4 broods left the nests in May, 2 in June, 5 in July, and 9 in August. (In particular in dry summers, much breeding takes place late in the summer, even extending into early autumn.)

3. Results and discussion

Table 1 gives the total number of eggs produced by the entire study population in 1976, together with data on the overall mortality rate of eggs, nestlings and fledglings (predation as well as other kinds of losses are treated together as

Table 1. Reproduction data for an urban population of Blackbirds in the city of Lund, South Sweden.

	Initial number	Lost	Mortality %	Days of exposure	Daily mortality rate (%)
Eggs	146	67	46	14	4.29
Nestlings	79	22	28	13	2.47
Fledglings	57	18	32	20	1.88

mortality throughout this paper). About half (46 %) of the eggs laid did not hatch (robbed, infertile etc.), and 28 % of the nestlings died or disappeared (predation) before fledging. The mortality of the fledglings during the period up to independence was 32 %. Since the length of these three periods differ, being 14, 13 and 20 days, respectively, these mortalities are not directly comparable. To obtain comparable values, mean daily mortality rate for each category was calculated (Table 1). Daily mortality rate is derived from the formula

$$N_t = N_o s^t \text{ and } d = 1-s$$

were N_t is the number (of eggs, young, fledglings) at day t, N_o is the initial number, s is the daily survival rate and d the daily mortality rate.

As seen from the table, eggs suffered a much higher daily mortality than nestlings did. The reason simply seems to be that most of the easily detected nests were in fact found by predators (especially corvids) during the early stages of laying and incubation while the better concealed nests had a lower risk of being detected and, therefore, a better chance of surviving also the nestling stage. The survival chances of an individual nest may also increase with time, in particular early in the breeding season, as the vegetation develops.

Table 1 shows that the daily mortality rate from fledging to independence is 76 % of that during the nestling period (1.88 versus 2.47 % daily mortality). This indicates that it is safer to be out of the nest than to remain there. This conclusion is also supported by the well-known habit of young Blackbirds (and many other nidicolous open-nesters) to leave the nest before being able to fly. However, a closer analysis of the timing of fledgling mortality casts some doubt on this conclusion. As seen from Table 2 the fledgling mortality was concentrated to the first five days out of the nest. During these first days the young are unable to fly. In fact the daily mortality rate during these days was 70 % higher than that of the nestling period. From day 6 up to day 15 the mortality rate was lower, and from day 16 to independence there was no fledgling mortality at all.

Table 2. Daily mortality rates (%) for Blackbirds during different stages of the life of the young.

	Initial number	Lost	Mortality %	Days of exposure	Daily mortality rate (%)
Nestlings	79	22	27.8	13	2.47
Fledglings					
Day 1-5	57	11	19.3	5	4.20
Day 6-10	46	3	6.5	5	1.34
Day 11-15	43	4	9.3	5	1.43
Day 16-indep.	39	0	0		0
Total	57	18	31.6	20	1.88
From indep. to breeding time; 200 days (Snow 1958)					0.24
Adults (Coulson 1961)					0.16

Table 3. Overall mortality of Blackbird fledglings from nest leaving to independence in an urban population in Lund, South Sweden.

Fledging time	No. of broods	Mortality until independence (%)
May	4	76
June	2	12
July	5	6
August	5	0

Table 4. Fledgling mortality (%) to independence for some bird species. (Data mainly from Alerstam & Högstedt 1983; Table 2).

	Mortality	Source
Dolichonyx oryzivorus	50	Wittenberger 1978
Seiurus aurocapillus	44	Hann 1937
Anthus campestris	44	Alerstam & Högstedt 1983
Turdus merula	32	This study
Melospiza melodica	30	Nice 1937
Aphelocoma coerulescens	26	Woolfenden 1973
Asio otus	22	Nilsson 1981
Pica pica	21	Alerstam & Högstedt 1983
Sialia sialia	19	Pinkowski 1977
Auriparus flaviceps	18	Austin 1977
Babulcus ibis	3	Siegfried 1972
Parus atricapillus	3	Smith 1967
Parus palustris	1-4	Nilsson & Smith unpubl.
Buteo buteo	0	Sylvén 1982

The Blackbirds' mortality decreased substantially over the season (Table 3). The reasons for this were not studied, but one explanation is that it is easier for the fledglings to find cover against predators late in the season when the foliage is fully developed. Daily work in the area also gave the impression that the predator pressure decreased with the progress of the season.

In our study of urban Blackbirds, 32 % of the young died in the period from nest-leaving to independence. Corresponding figures for some other bird species are given in Table 4. It is hard to find any general trends in the data, but it is notable that a hole-nester such as the Marsh Tit (*Parus palustris*) and larger species with small clutches/broods (e.g. the Common Buzzard; *Buteo buteo*) have a low fledgling mortality compared with many of the other species listed.

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