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Breeding success of Wryneck *Jynx torquilla* during the last 40 years in Sweden

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Abstract

The Swedish population of Wrynecks *Jynx torquilla* has decreased at least during the last decades. The reason can be worse breeding success, fewer breeding places, or problems in the wintering areas. This study compares brood size at ringing and number of ringed broods between the periods 1962–1981 and 1982–2001. Breeding success did not decrease. On the contrary, a small but significant increase was shown, from 6.7 to 7.1 young per brood. Despite this the number of ringed broods declined from 1016 to 449. Deducting an observed 15% loss between ringing and fledging, 5.7–5.8 young would fledge from broods that were not deserted before ringing. Wrynecks lay about 10 eggs, so the loss to fledging is high, but despite this the observed brood size ought to be enough to maintain a stable population if mortality alone were to be compensated, indicating that habitat loss is the most likely explanation for the decline, probably diminishing area of pasture with fewer grazing cattle which in turn decrease the abundance of the ant species on which the Wrynecks feed.

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Introduction

The number of Wrynecks has decreased during the last 20 years in Sweden (Svensson 2000, SOF 2002). In the late 1990s the size of the population was only 20% of what it was in the late 1970s and early 1980s (Svensson 2000). Decreasing numbers is a common trend in the whole of Europe and it seems to have begun early in the 20th century (Glutz et al. 1980, Cramp 1989). Linkola (1978) observed that the number of breeding pairs decreased from 1952 to 1977 in his large study of the Wryneck in Finland.

The reason for the diminishing number of Wrynecks is thought to be replacement of open, often deciduous and mixed forests by denser forests of mainly Norwegian spruce, and afforestation of numerous small farms that previously often hosted grazing cattle. Fewer grazing cattle caused invasion of bushes to the grasslands. The ensuing decline of insolation reaching the ground decreased the abundance of the ant species, on which the Wrynecks feed.

However, the decrease may also be connected with lower breeding success or deteriorating conditions in the wintering quarters. Unfortunately we do not know where the Wrynecks are wintering. According to Glutz et al. (1980) and Cramp (1989), the most southern ring recovery is from a Swedish bird in Marrakesch in September 1959, but in 1989 a Swedish bird was caught south of Agadir some hundred kilometres further south. Observations have been made on more southern places in Africa (Cramp 1989) but the origin and number of the birds is unknown.

Material and methods

Since 1962 through 2001, 1465 broods with 10,031 young Wrynecks have been ringed in Sweden according to the Swedish Bird Ringing Centre. Therefore it is possible to compare the breeding success during the course of four decades. I have compared the mean number of ringed young between the two periods 1962–1981 and 1982–2001 and also the number of broods between the same periods.

Results

Between 1962 and 1981, 6842 young were ringed in 1016 broods with a mean of 6.73 young per brood. Between 1982 and 2001, 3189 young were ringed in 449 broods with a mean of 7.10 young per brood. The difference between the two means is significant (t= 2.80; P=0.0052; Table 1).

When comparing the number of broods there was a dramatic decline of 56% between the periods. For the whole forty years period the linear decline was significant (b = –1.14±0.19 (SE); t = –5.92; P = 0.000). When the regression was calculated for the early and late twenty years period separately the trend in the first period was negative but not significant (b = –0.98± 0.47 (SE); t = –2.05; P = 0.055) but in the second period it was slightly positive (b = +0.44±0.48 (SE); t = 0.91; P = 0.376). If the last six years of ringing activties in a special Wryneck project are excluded from the other ringing activities, the slope in the second period becomes negative (b = –0.61±0.26 (SE); t = –2.34 P=0.03; data in Table 2). The number of broods ringed during the two periods is shown in Table 2. The number of broods between the two periods is quite different and the slope of the lines (b) is clearly different depending on the last years of ringing activties. The reason for the non-significant regression coefficients in the divided material depends on fewer and therefore more uncertain data which is shown by the standard error terms.

The variation in brood size is shown in Table 1. The number of young in the broods was smaller when the broods were ringed after 1 July. Brood size was 6.98 (1250 broods) before and 6.23 (214 broods) after 1 July. Extreme dates when young were ringed were one brood on 25 May and one on 9 August. The increase in brood size between the time periods was evident among both early and late broods. Mean brood size before 1 July was 6.87 (849 broods) vs. 7.21 (401 broods) in the early and late period, respectively. The corresponding values for broods ringed after 30 June was 6.08 (166 broods) vs. 6.23 (48 broods).

The number of broods ringed after 1 July decreased from 16% before to 11% after 1981. The median date of the ringing was 29 June in 1962–1981 and 27 June in 1982–2001.

26% of the broods were ringed north the 60° latitude in 1962–1981 and 18% in 1981–2001. The number of young did not show any significant differences between the northern and southern part of Sweden when the periods are separated (6.78 young per brood in the southern part and 6.60 in the northern part during 1962–1981 and 7.11 young per brood in the southern part and 7.05 in the northern part during 1982–2001). The median date for the ringing in the northern part was 2 July during 1962–1981 and 1 July during 1982–2001.

Since 1982 the ringers are asked to inform about dead young and unhatched eggs in the broods. In 443 broods, the mean number of dead young was 0.22 and the mean number of unhatched eggs was 0.89.

Discussion

The results show that the number of young per brood has not declined between the study periods. On the contrary, a small but significant increase, from 6.73 to 7.10 young per brood, was detected. The reason for this fact is impossible to know. But my guess is that fewer young are ringed in less favourable biotopes and that the broods are ringed at an earlier stage of growth. Both causes would increase the number of ringed young. If birds have abandoned the worst environments, which produce fewer young per brood, the remaining broods will be larger, and if the young are ringed when younger, fewer will have died before ringing.

In my experience, according to Linkola (1978), and occasionally as recorded in the ringers' protocols,

Table 1. The variation in brood size of the 1465 broods.
Variationen i kullstorlek i det undersökta materialet.

No. of broods *Antal kullar*	Brood size *Antal ungar*												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1962–1981	16	27	61	79	110	129	164	192	143	71	21	2	1
1982–2001	10	13	25	26	37	40	71	84	71	54	15	3	0
All years *Alla år*	26	40	86	105	147	169	235	276	214	125	36	5	1

Table 2. Number of broods (B) and young (Y) of the Wryneck ringed in Sweden, with ringing in a special Wryneck project excluded. BP and YP show the additional number of broods and young ringed within this project.
Antalet kullar (B) och ungar (Y) av göktyta som ringmärkts i Sverige, med ringmärkningen inom Projekt Göktyta utesluten. BP och YP visar det ytterligare antal kullar och ungar som märkts av Projekt Göktyta.

Year	B	Y	Year	B	Y	Year	B	Y	Year	B	Y	Year	BP	YP
1962	78	490	1972	46	337	1982	29	202	1992	9	60			
1963	46	304	1973	54	382	1983	35	237	1993	9	51			
1964	30	205	1974	53	354	1984	24	148	1994	15	109			
1965	44	309	1975	51	313	1985	19	140	1995	10	61			
1966	50	346	1976	54	380	1986	14	90	1996	8	64	1996	8	70
1967	59	357	1977	39	265	1987	18	104	1997	12	104	1997	6	55
1968	69	489	1978	39	244	1988	19	139	1998	18	140	1998	10	71
1969	69	440	1979	31	335	1989	27	177	1999	17	126	1999	11	95
1970	56	361	1980	38	384	1990	17	126	2000	23	149	2000	12	95
1971	70	458	1981	40	289	1991	16	99	2001	23	152	2001	40	325

young sometimes die also after they have been ringed. Most ringers do not inspect their nest boxes during the weeks after they have ringed the young. Next year the dead bodies have disappeared, eaten by fly larvae or covered by tit nests. Linkola (1978) reports that of 721 ringed young as much as 108 young were found dead (15%) in the nest after the ringing. In my own limited experience I found 9 dead young of 64 ringed (14%). Thus early ringing has an effect on the number of ringed young.

Linkola (1978) found a mean of 10.2 eggs per brood, and after all losses (dead young and unhatched eggs) a pair reared 5.5 young per year. Linkola also reported dead young and unhatched eggs at the ringing occasion and he found 0.9 unhatched eggs and 0.4 dead young. In my material I found 0.89 unhatched eggs and 0.22 dead young. Perhaps Linkola ringed his young later and therefore found more dead young. If I exclude dead young, after the young have been ringed (c. 15%), I get 5.6–5.7 fledged young per nest, slightly more than Linkola.

It seems to be a waste of energy for the Wryneck to lay more than 10 eggs and only get 5.5 young. On the continent it is known that the Wryneck is able to rear two or three broods a year (Glutz et al. 1980). In Sweden no second brood has been documented. Gullquist (pers. comm.) once found a Wryneck brood that was laid a few days after the young of another Wryneck left a nest box. But he did not know if the second bird(s) breeding was (were) the same as the first one(s). Linkola (1978) found two broods where he could retrap one of the birds, which had bred earlier in the neighbourhood. Late broods, ringed in late July in the southern part, are probably replacement broods after a previous breeding failure. However, the very few possible second broods cannot compensate for the very high breeding losses.

The oldest Wryneck found in Sweden was exactly five years old. Glutz et al. (1980) mention a Wryneck retrapped when breeding in Niedersachsen at least 10 years old. Unfortunately no estimations of survivals have been done for the Wryneck and the Swedish material of Wrynecks found dead is too small (only 109 specimens have been found since 1911; Report on Swedish Bird Ringing for 2000) for making a calculation.

It seems probable that the Wryneck, despite the high breeding losses, should be able to maintain its population size with a production of about 5,5 young per nest. It is apparently possible to increase the number of nesting pairs if nestboxes are available (Wryneck project; Table 2) indicating that the population is not decreasing depending on bad breeding results.

However, the number of ringed broods has decreased dramatically during the period studied. Already between 1962 and 1981, a decrease was found although not significant. Linkola (1978) reported that "During the observation period (1967–1977) the number of pairs has obviously decreased" (my translation). The decrease of breeding pairs during the two latest decades is not so pronounced depending on an increase of ringing activity within a Wryneck project started in 1996 (see Axelsson et al 1997) where hundreds of nest boxes were put up in favourable biotopes for the Wrynecks.

Linkola (1978) thought that the diminishing number of breeding Wrynecks depended on pastures being invaded by coniferous trees and that the grazing of cattle was rapidly decreasing. I think that this is

the main reason also in Sweden knowing that the number farmers, mostly small farmers, has decreased very fast during the studied period. Another reason for fewer Wrynecks may be fewer holes in trees. When nest boxes are put up, around 80% of them are occupied by tits, Pied Flycatchers, and other bird species. The increasing number of ringed broods the last few years depends probably on the Wryneck project where the Wryneck found hundreds of suitable nestboxes in favourable biotopes. It is known that Wrynecks can breed in rather dense populations (8/ha) without territory conflicts (Glutz et al 1980). Therefore more nest boxes in favourable environments can perhaps in a small scale compensate a diminishing population in other parts of the country. In my material it may also be that Swedish ringers nowadays are less interested in ringing Wrynecks but I do not think that this is the case.

This article shows that the breeding Wrynecks produce a number of young that is probably enough to maintain a stable population. Therefore, the population decrease known from surveys (Svensson 2000) and bird-ringing stations (Karlsson et al. 2002) probably depends on changes in the environments, making them less favourable to breed in. That fewer broods have been ringed in later years certainly depends on the fact that fewer Wrynecks are breeding in Sweden. However, more nest boxes in suitable biotopes and more engaged ringers can of course increase the number of ringed broods and veil the decreasing number if Wrynecks.

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References

Axelsson, C., Nömm, M., Carlsson, H. & Carlsson, L. 1997. Projekt göktyta *Jynx torquilla*: biotopval och häckningsframgång (Project Wryneck *Jynx torquilla*: habitat selection and breeding success. *Ornis Svecica* 7(1): 35–37.

Cramp, S. (ed.) 1989. *Handbook of the birds of Europe, the Middle East and North Africa. The Birds of Western Palearctic.* Vol. IV. Oxcford Univ. Press, Oxford.

Glutz von Boltzheim, U. N., Bauer, K. & Bezzel, E. 1980. *Handbuch der Vögel Mitteleuropas*. Vol. IX. Frankfurt a.M.

Karlsson, L., Ehnbom, S., Persson, K. & Walinder, G. 2002. Changes in numbers of migrating birds at Falsterbo, South Sweden, during 1980–1999, as reflected by ringing totals. *Ornis Svecica* 12(3): 113–137.

Linkola, P. 1978. Häckningsbiologiska undersökningar av göktyta i Finland 1952–1977. (On the breeding biology of the wryneck *Jynx torquilla* in Finland) *Anser*, Suppl. 3: 155–162. (Proceedings of the first nordic congress of ornitology 1977).

SOF. 2002. *Sveriges fåglar.* Sveriges Ornitologiska Förening.

Svensson, S. 2000. *Övervakning av fåglars populationsutveckling. Årsrapport för 1999.* Ekologiska institutionen, Lunds universitet.

Sammanfattning

Häckningsframgången hos göktyta Jynx torquilla *under de senaste fyrtio åren i Sverige*

Studien behandlar göktytans häckningsframgång och omfattar en jämförelse mellan de två tjugoårsperioderna 1962–1981 och 1982–2001. Jämförelsen grundar sig på antalet ringmärkta kullar och ungar enligt Ringmärkningscentralens statistik. Ingen minskning i antalet ringmärkta ungar per kull, utan en statistiskt säkerställd ökning kan märkas, från 6,73 ungar åren 1962–1981 till 7,10 ungar åren 1982–2001. Orsaken till detta kan vara att göktytan har lämnat mindre gynnsamma häckningsområden till förmån för de hagmarkslokaler som finns kvar. En minskning i antalet märkta kullar är påtaglig i materialet, vilket är i överensstämmelse med den beståndsnedgång som registrerats genom häckfågeltaxeringar och fågelstationsfångst. Från att drygt 1000 kullar ringmärktes under de två första årtiondena så märktes knappt 450 under de senaste 20 åren. Kullantalet minskade redan under de första två årtiondena men har ökat något de senaste åren, troligen beroende på projektet Göktyta. I projektet Göktyta har några hundra holkar satts upp i gynnsamma lokaler vilket gynnat göktytan som på så sätt fått tillgång till lämpliga boplatser. Efter stora förluster i döda ungar och okläckta ägg får göktytan fram drygt 5.5 ungar per par från i genomsnitt ca 10 ägg. Den ungproduktion som ringmärkningen visar bör vara tillräcklig för att upprätthålla en stabil population vilket projektet Göktyta tyder på. Ju fler holkar som satts upp desto fler häckande göktytor, vilket tyder på att brist på naturliga håligheter kan vara en av orsakerna till göktytans minskade population. Orsaken till göktytans beståndsnedgång måste således vara något annat än för låg häckningsframgång, mest sannolikt biotopförluster.