Korta rapporter *Short communications*

https://doi.org/10.34080/os.v9.22902

The laying dates of Starlings *Sturnus vulgaris* in northwestern Croatia

ZDRAVKO DOLENEC

Flux (1987) recorded a trend of laying dates in a Starling *Sturnus vulgaris* population. The birds bred approximately one day later each year from 1970 to 1986. Such a drift of the start of breeding could be evolutionarily advantageous, allowing an animal with highly synchronized breeding seasons to track environmental changes. Flux conducted his studies at Belmont, New Zealand (41° 10' S, 174° 55' E) and asked if anybody had recorded anything similar at other locations. His Starlings nested in nest boxes placed on buildings on sheep farms with very few trees.

Since Flux' study there has been a growing interest in bird phenology, especially since arrival time of migrants (Sokolov et.al. 1998) or laying date (Humphrey et al. 1997, Sokolov et al. 1998) as revealed by long-term time series may track climatic shifts. Such long term data would then be possible to use in order to assess the effects on biological systems if human activities influence climate. Warmer spring conditions have also recently been suggested to have caused long-term range shifts of birds in Britain (Thomas & Lennon 1999). Many papers before these have shown the sensitivity of birds as monitors of climatic trends, and it seems urgent that ornithologists pay more attention to the collection of long-term data on migration and breeding phenology, and also publish older data that they may already have.

In this communication I report that Starlings breeding in the Mokrice area (46° 00' N, 15° 55' E), 35 km north of Zagreb have shown a weak tendency to start breeding earlier during the last two decades. My studies cover the period from 1980 through 1999. All nest boxes were put up in trees 2.5 to 5 m above the ground in an area with mixed farming, a habitat that is considered to be the most beneficial for the breeding of Starlings (e.g. Tenevuo & Lemmetyinen 1970, Cramp & Perrins 1994).

During the whole period, the Starlings were offered 40 to 100 nest boxes, but only the 30 first occupied nest boxes were used in the analysis (several nest boxes remained unoccupied every year). Thus, the study includes only first clutches.

Most Starlings returned from their wintering grounds in Italy and North Africa in the second half of February (Dolenec 1994, 1998). From 25 March onwards, the nest boxes were visited every day in order to record the laying of the first eggs. The term "laying date" is defined as the date of laying of the first egg in a clutch. Starlings are known for intraspecific parasitism (e.g. Yom-Tov et al. 1974, Greig-Smith et al. 1988) and parasitically laid eggs were excluded from this analysis (most recognized by colour differences and by two eggs laid the same day). The mode was used as the measure of the start of laying (Flux 1987).

Figure 1 shows that laying of the first eggs was very synchronized, in each of the 20 years all eggs in the 30 boxes were laid within 5 to 7 days (mostly 7). Similar observations have been made by other authors (e.g. Flux 1987, Tiainen et al. 1989).

Figure 2 shows that the laying time of the Starlings nesting in the Mokrice area tended to drift earlier with time (however not statistically significant). This is opposite to the results in New Zealand where the population tended to breed successively later (Flux 1987). The results of my studies are similar to those obtained in the Czech Republic and Slovakia (Havlin & Folk 1961). In these countries, the Starlings also tended to nest earlier during a whole 15-year study period, approximately by two thirds of a

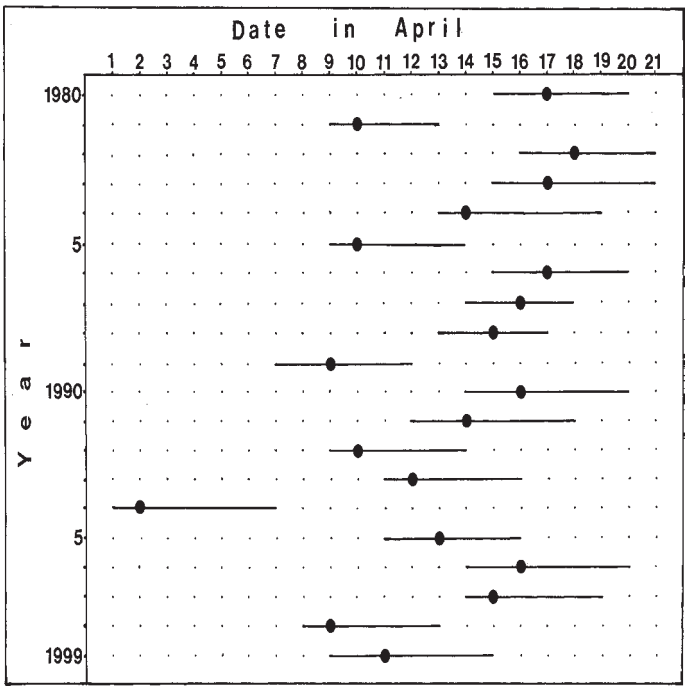

Figure 1. Laying dates of the first egg in the first clutch of Starlings breeding at Mokrice, Croatia, in 1980–1999. 30 nest boxes every year (— range of laying dates ; • mode).
Läggningsdatum för första ägget i första kullen hos stare vid Mokrice, Kroatien, åren 1980–1999. 30 holkar varje år (— intervall; • typvärde).

day per year. However, the trend was not so strong as in the Mokrice area. Karlsson (1983) neatly summarized the prevailing view that "factors such as day-length and temperature act as hour-hand, yearly variations in weather and food as minute-hand and social behaviour as second-hand in the synchronization of breeding in the starling".

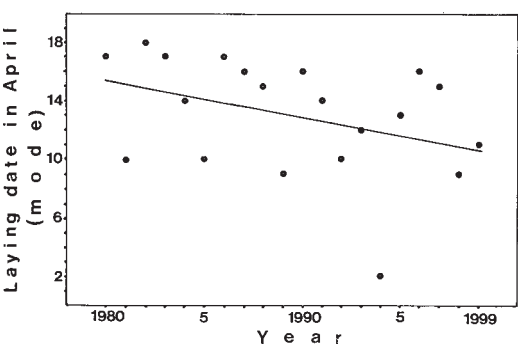

Figure 2. Modal laying date versus year by Starlings at Mokrice in 1980–1999 (y=511.17 – 0.25x; r=-0.376; P not significant).
Typvärde för läggningsdaatum mot år för stare vid Mokrice åren 1980–1999.

Ringing helped me to determine that older birds were the first to start laying, later followed by younger birds. Similar data for Starlings can be found in Verheyen (1969), and for many other bird species in e.g. Lessells & Krebs (1989).

Figure 3 presents the relationship between the start of laying and the mean clutch size. The regression line shows that the mean clutch size was slightly higher when the laying started later (not statistically significant). However, this does not apply to the whole nesting period in a particular year. Second clutches always contain a smaller number of eggs than do first clutches (Dolenec 1997).

From my own study and the two from the Czech republic and Slovakia, I conclude that there is a trend towards earlier egg laying of the Starling in central Europe, a tendency that is opposite to the one found in New Zealand, but similar to what found for several species in Europe.

References

Cramp, S. & Perrins, C. M. (eds.) 1994. *The birds of the Western Palearctic*. Vol. VIII. Oxford University Press.

Dolenec, Z. 1994. Regular migrations of the autochtonous Starling, *Sturnus vulgaris* L., of the Hrvatsko Zagorje Region (north-west Croatia). *Riv. ital. Ornitologia* 64 (1): 14–20.

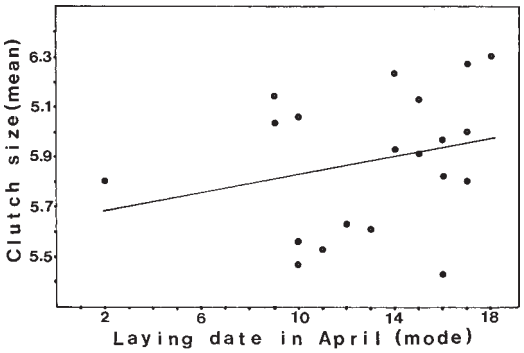

Figure 3. Mean clutch size for first clutches at Mokrice in 1980–1999 as a function of modal laying date (y=5.64 + 0.02x; r=0.263; P not significant).
Medelkullstorleken för förstakullarna vid Mokrice åren 1980–1999 som funktion av läggningsdatum.

Dolenec, Z. 1997. Supplement to nesting habits of Starling (*Sturnus vulgaris* L.) on the territory of North-West Croatia. *Larus* 46: 120–125.

Dolenec, Z. 1998. The return of the local breeding population of starlings (*Sturnus vulgaris* L.) from their wintering quarters to the area of Hrvatsko Zagorje (NW Croatia). *Natura Croatica* 7 (2): 121–126.

Flux, E. C. 1987. Drift in laying dates of Starlings, *Sturnus vulgaris* L. *Ornis Scand.* 18: 146–148.

Greig-Smith, P. W., Freeman, E. M. & Spenser, P. L. 1988. Causes and consequences of egg-size variation in the European Starling *Sturnus vulgaris* L. *Ibis* 130: 1–10.

Havlin, J. 1983. The breeding season and number of young in the Starling, *Sturnus vulgaris* L., in Czechoslovakia. *Zool. Listy* 10: 67–84.

Humphrey, Q., Crick, P., Dudley, C., Glue, D. E. & Thomson, D. L. 1997. UK birds are laying eggs earlier. *Nature* 388: 526.

Karlson, J. 1983. *Breeding of the starling* Sturnus vulgaris L. Ph. D. thesis, Univ. of Lund.

Lessells, C. M. & Kerbs, J. R. 1989. Age and breeding performance of the European Bee-eater. *Auk* 106: 375–382.

Sokolov, L. V., Markovets, M. Yu. 1998. Long-term trends in the timing of spring migration of passerines on the Courish Spit of the Baltic Sea. *Avian Ecology and Behaviour* 1: 1–21.

Sokolov, L. V. & Payevsky, V. A. 1998. Spring temperatures influence year-to-year variations in the breeding phenology of passerines on the Courish Spit, eastern Baltic. *Avian Ecology and Behaviour* 1: 22–36.

Tenevuo, R. & Lemmetyinen, R. 1970. On the breeding ecology of the Starling *Sturnus vulgaris* L. in the archipelago of south-western Finland. *Ornis Fennica* 47: 159–166.

Thomas, C. D. & Lennon, J. J. 1999. Birds extend their ranges northwards. *Nature* 399: 213.

Tiainen, J., Hanski, J. K., Pakkala, T., Piiroinen, J. & Yrjölä, R. 1989. Clutch size , nestling growth and nestling mortality of the Starling *Sturnus vulgaris* L. in South Finish agroenvironments. *Ornis Fennica* 66: 41–48.

Verheyen, R. F. 1969. Arrival at the breeding area, maturity for breeding and onset of laying according to age in the Starling population (*Sturnus v. vulgaris* L.) of lower middle Belgium. *Gerfaut* 59: 378–384.

Yom-Tov, Y., Dunnet, G. M. & Anderson, A. 1974 . Intraspecific nest parasitism in the Starling *Sturnus vulgaris. Ibis* 116: 87–90.

Sammanfattning

Läggningsdatum hos stare Sturnus vulgaris *i nordvästra Kroatien*

Det finns ett växande intresse för att analysera fenologiska fenomen över långa tidsperioder, särskilt med tanke på de effekter på faunan som eventuella människoskapade klimatförändringar kan komma att få. Nyligen har en studie av starens läggningsdatum på Nya Zeeland visat på en senare äggläggning sedan 1970. Andra studier har nyligen visat på tidigare läggning hos flera fågelarter i Storbritannien och man tror sig ha kunnat knyta vissa förändringar i utbredningen till varmare vårar under senare tid.

I denna rapport visas att starar som häckar i holkar vid Mokrice i Kroatien under den senaste tjugoårsperioden tidigarelagt häckningsstarten en aning. Stararna hade varje år tillgång till mellan 40 och 100 holkar i ett jordbruksområde av blandtyp. De trettio första häckningarna varje år användes i denna studie, d.v.s. endast förstakullarna. Senare kullar är andrakullar.

Holkarna besöktes varje dag från 25 mars och datum för första ägget registrerades. Figur 1 visar att läggningen var starkt synkroniserad, från 5 till 7 dagar, vilket är normalt för arten. Figur 2 visar att läggningsdatum tenderade att ligga tidigare senare under perioden (dock inte signifikant). Detta är motsatt förhållandet på Nya Zeeland men i överensstämmelse med andra studier i Tjeckien och Slovakien. Figur 3 tyder på en svag, ej signifikant, tendens till större kullar när läggningsdatum låg senare på säsongen. Detta gäller dock bara förstakullar; andrakullarna är i regel alltid mindre.

Från min studie tillsammans med resultat från andra studier drar jag slutsatsen att det tycks finnas en svag tendens till tidigare äggläggning hos stare i centrala Europa, alltså en tendens motsatt den man funnit på Nya Zeeland.

Zdravko Dolenec, Department of Zoology, Faculty of Science, University of Zagreb, Rooseveltov trg 6, 10000 Zagreb, Croatia