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GENERAL NOTES

Experimental synchronization of sparrow reproduction.—This paper describes the results of attempts to synchronize the breeding activities of populations of House Sparrows (*Passer domesticus*) and European Tree Sparrows (*P. montanus*). The technique was first used to try to synchronize the breeding activities of House Sparrow populations so that hatching and the nestling period would coincide with peak emergence time of the 13-year periodical cicadas (*Magicicada* spp.) in order to test the effect of this superabundant food supply on reproductive success (see Anderson, Condor 79:205–208, 1977). The technique was also used to synchronize the breeding populations of both species in the same habitat in Poland so that the nestling diets of the 2 species could be compared at the same time within the same habitat and among nestlings of the same age. The nestling diets of the 2 species change markedly throughout the course of the prolonged breeding season (Anderson, Occ. Pap. Univ. Kans. Mus. Nat. Hist. 70, 1978) and with nestling age (Kalmbach, USDA Tech. Bull. 711, 1940; Grün, unpubl. Ph.D. dissert., Ernst-Moritz-Arndt-Univ., 1964). Although there is considerable overlap in the breeding seasons, particularly as the season progresses, the peak House Sparrow breeding begins 7–10 days before the European Tree Sparrow peak (Mackowicz et al., Ekol. Polska A 18:465–501, 1970).

The synchronization method consisted simply of removing the nest contents (eggs and/or nestlings) from all active nests on the same day. In the United States this was done on 4 May 1976, in 7 breeding colonies (some of which contained both species) in Missouri and Illinois near St. Louis, Missouri. In Poland the contents of nests were removed on 21 and 25 April and 27 and 28 May 1977, from nests in Dziekanów Lésny and Palmiry, near Warsaw. A description of that study area can be found in Pinowski (Ekol. Polska A 15:1–30, 1967). All nests in both studies were in nest-boxes.

I interrupted 140 (66 House Sparrow and 74 European Tree Sparrow) breeding attempts. In 48.6% of these nests, renesting occurred within 2 weeks of the interruption. In an additional 7.1% laying continued uninterrupted in nests where the clutch was not complete when interrupted. The desertion rate was therefore quite high (44.3%) and did not differ significantly between the species (House Sparrow 43.9%, European Tree Sparrow 44.6%, $P > 0.95$).

The desertion rate appeared to be affected by the availability of alternative nest-sites. Occupancy of nest-boxes ranged from 10 to 88.9% in different colonies. The desertion rate in the colony with 88.9% occupancy was only 20% while in the remaining colonies (average 26.3% occupancy) it was significantly higher (55.8%) ($P < 0.001$).

The mean interval between the interruption of 1 nesting attempt and the initiation of a new clutch in the same nest was 7.0 days (range 3–13, $s_{\bar{x}} = 0.47$) in the House Sparrow and 6.8 days (range 2–13, $s_{\bar{x}} = 0.38$) in the European Tree Sparrow. The difference was not significant ($t = 0.252$, $P > 0.80$). The House Sparrow had a strong mode of 7 days, and the European Tree Sparrow had a strong mode of 6 days (Fig. 1). Of the renesting efforts, 65.5% of the 29 House Sparrow clutches and 66.7% of the 39 European Tree Sparrow clutches were begun 6–8 days after the interruption.

The stage of the nesting cycle at which the nest was interrupted did not appear to have a consistent effect on either the interval between interruption and the initiation of a replacement clutch or on the desertion rate (Table 1). In the House Sparrow the interval was shortest in nests interrupted during egg laying, and was progressively longer in nests interrupted during the incubation and nestling periods. However, the differences

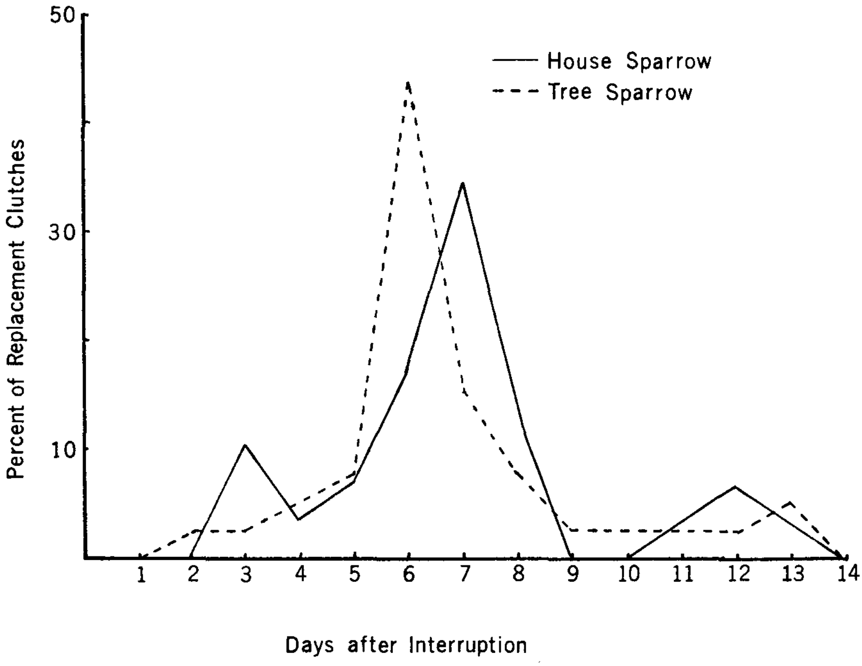

FIG. 1. Interval between interruption of breeding effort and initiation of a replacement clutch in House Sparrows and European Tree Sparrows.

were not significant ($P > 0.20$ in all cases). In the European Tree Sparrow the situation was reversed, with the longest interval being observed in nests interrupted during laying and progressively shorter intervals observed as the breeding cycle continued. The difference between the interval for nests interrupted during laying and those interrupted during the feeding of nestlings was, however, the only significant difference ($t = 2.424$, $P < 0.05$).

The highest desertion rate in the House Sparrow was from nests interrupted during incubation, while the lowest rate was observed in nests interrupted during laying. The difference was significant ($\chi^2 = 9.821$, $P < 0.01$). In the European Tree Sparrow the highest desertion rate was observed in nests interrupted during the nestling period, but the differences between stages were not significant.

The data were insufficient to analyze for intercontinental differences in desertion rates and intervals before renesting in the 2 species, but there were no apparent differences between continents.

The synchronization techniques proved basically successful. The high percentage of birds that initiated a replacement clutch 6–8 days after the interruption of their initial breeding effort was particularly significant. The use of alternative sites in sparsely populated colonies, with a similar interval between the interruption and the initiation of a second clutch, further increased the effectiveness of the technique. The technique might

TABLE 1

DESERTION AND RENESTING RATES AND INTERVALS TO RENESTING OF HOUSE SPARROWS AND EUROPEAN TREE SPARROWS AFTER INTERRUPTION OF ACTIVE NESTS, ACCORDING TO STAGE OF NESTING CYCLE AT TIME OF INTERRUPTION

Species	Nesting stage	N	% deserted	% continued	% renested	Intervals in days ($s_{\bar{x}}$)
European Tree Sparrow	Laying	37	35.1	5.4	59.5	7.4(0.64)
	Incubation	14	35.7		64.3	6.3(0.17)
	Nestling	23	65.2		34.8	5.6(0.32)
	Total	74	44.6	2.7	52.7	6.8(0.38)
House Sparrow	Laying	16	12.5	50.0	37.5	5.5(1.36)
	Incubation	24	62.5		37.5	7.0(0.71)
	Nestling	26	46.1		53.8	7.6(0.60)
	Total	66	43.9	12.1	43.9	7.0(0.47)

be successfully used in a number of experimental situations where synchronization of breeding in free-living sparrow populations is desirable.

The applicability of the technique to other bird species is questionable. Most open-nesting species desert their nest after a nest failure and, if they renest, construct a new nest at a different site. Other hole-nesting species, which use a nest-site that affords more protection than an open site (Nice, Auk 74:305–321, 1957) and that is frequently in short supply (von Haartman, pp. 391–459 *in* Avian Biology, Vol. I, D. S. Farner and J. R. King, eds., Academic Press, New York, 1971), may be less prone to desert their nest-site after a failure, although I have no data to support this suggestion. The response of the 2 sparrow species may represent an adaptation to their commensal relationship with man. Persistence in attempting to nest in a favorable site in spite of active interference by man may be selectively advantageous.

I thank Drs. J. Pinowski, B. Pinowska and M. Luniak for their many contributions in support of my research in Poland. Research in Poland was funded jointly by the Polish Academy of Science and the National Academy of Sciences (USA) under their research exchange program. Work in the United States was funded by NSF grant DEB76-10243.—TED R. ANDERSON, *Division of Science and Mathematics, McKendree College, Lebanon, Illinois 62254.* *Accepted 24 June 1978.*

Wilson Bull., 91(2), 1979, pp. 319–321

Sexual differences in feeding territoriality of the Crowned Woodnymph, *Thalurania colombica*.—We observed territorial behavior of an adult male and female Crowned Woodnymph (*Thalurania colombica*) on 27, 28, 29 June and 2 July 1977, near the Limbo Hunt Club on Pipeline Road, Gamboa, Canal Zone. Sexing and aging followed Ridgway (U.S. Natl. Mus. Bull. 50, Pt. V, 1911). The female defended a smaller, higher quality territory than did the male and was more aggressive in defense, unlike other