

LONG-TERM STUDIES OF HOUSE SPARROWS (*PASSER DOMESTICUS*) ON LUNDY

by

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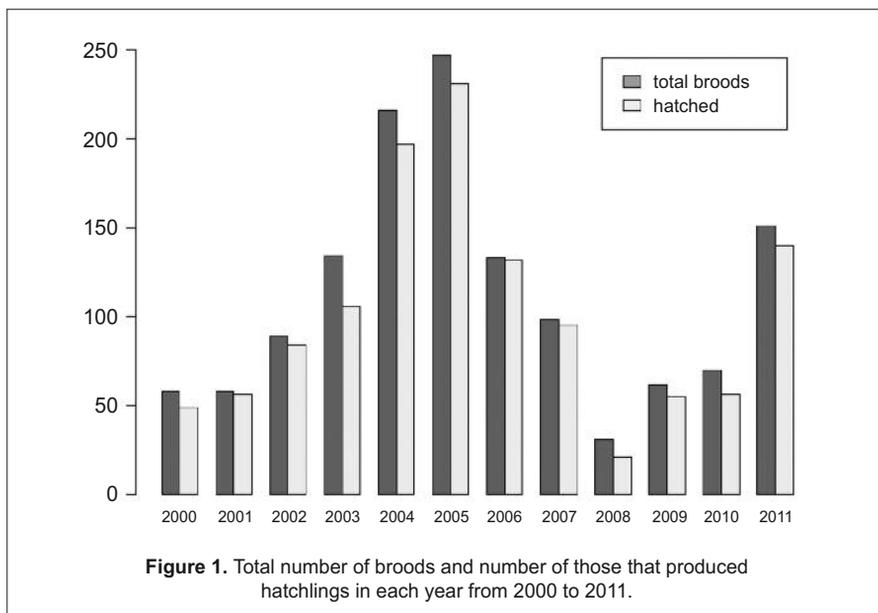
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Lundy House Sparrows are isolated from their mainland conspecifics by the 11 miles (18 km) of sea separating the island from Devon. Because of this geographical barrier, there is limited immigration – approximately 0.75 individuals per year (Griffith *et al.* 1999; Ockendon *et al.* 2009) and there has only been one recorded emigrant (unpublished data). In addition, House Sparrows are mainly active within just a small portion of the island. For such a closed and small population, it is possible to monitor all individuals in a particular year and track them through years to gain a complete picture of every individual's life history.

Our research group conducts annual surveys during the breeding season from April to August to monitor breeding attempts, and returns for two separate weeks during the winter to assess adult survival. We have pedigree information and morphological measurements for almost every individual sparrow for the last 15 years. Such a comprehensive monitoring scheme would be nearly impossible in a mainland population in which birds migrate in to and out of the population, compromising the estimates of survival and lifetime reproductive success that are essential for studies of evolution. The only other comparable datasets come from laboratory populations, but there are no ecological pressures in a lab. Thus, the Lundy population is a rare combination of comprehensive data which have been obtained from a natural setting, enabling us to identify the biological relevance of the traits we study.

The Lundy sparrow breeding season in 2011 started with the first egg on 3 April; eggs in that brood are estimated to have hatched on 17 April. Including this brood, we recorded 151 broods between April and August, with a peak of activity in May. One hundred and forty broods hatched at least one chick and, in total, produced 475 chicks and 75 unhatched eggs. Of the chicks that hatched, 360 (75.8%) survived to be ringed and 128 were recaptured after fledging. The population size in summer consisted of the 102 identified parents plus over 128 surviving fledglings. During the November field trip we recaptured 123 individual sparrows. During autumn and winter, two Sparrowhawks were present on the island, notably going inside the lambing shed as part of their sparrow hunting routine. This resulted in a dramatic reduction in the number of House Sparrows such that we caught just 41 individual birds in February 2012. In general, 2011 was an excellent breeding year for Lundy House Sparrows compared to previous years. The number of broods found dropped from 247 in 2005 to 31 in 2008, followed by a gradual recovery to 2011 (see Figure 1). However, we predict that the number of broods in 2012 will decrease again due to the dramatic reduction in sparrow numbers in the 2011/12 winter.

The accumulated data we have on the sparrows has enabled us to investigate ecological and evolutionary questions that can only be tackled with such large and comprehensive datasets. The team's recent research highlights include the demonstration by Cleasby *et al.* (2011) that sparrow chicks which received food supplements did not grow faster but became larger as adults. Schroeder *et al.* (2012) showed that an individual sparrow's fitness (survival, number of offspring, etc.) is consistent within individuals, heritable and to a great extent influenced by the mother.



Our ongoing observations are starting to give us unique insights into the daily lives of House Sparrows. We are beginning to get information on important life-history decisions that were previously impossible for us to investigate, such as the use sparrows make of nestboxes outside of the breeding season. In 2012, we are continuing to monitor this population in order to tackle our next research questions on parentage, variation in and role of individual personality, immunity genes and mate choice.

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