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Short communication

Rediscovery of the Scottish polecat, *Mustela putorius*: Survival or reintroduction?

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ABSTRACT

The recent rediscovery of the polecat (*Mustela putorius*) in Scotland has raised the question of whether the species has been present at low abundance all along or was covertly reintroduced. We assess the exceptionality of the recent sighting. The analysis suggests that the polecat was reintroduced.

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The polecat (*Mustela putorius*) once ranged widely throughout Scotland (Harvie-Brown, 1882). By the end of the 19th century, heavy persecution by gamekeepers and hunters had limited the polecat's range to Sutherland (Ritchie, 1920; Tetley, 1939). The last verifiable record of a polecat dates to 1914 (specimen NMSZ.1934.49.2, National Museums of Scotland) and the species was believed to have become extinct shortly thereafter (Langley and Yalden, 1977; Kitchener, 1998). Records of polecats continued to be reported in Scotland into the 1950's (Anon., 1928; Tetley, 1939; McGhie, 2002), but these are impossible to verify and there is a strong possibility that they represent feral ferrets (*M. furo*) or ferret-polecat hybrids. However, in 2004, four polecat specimens were retrieved as road casualties in Caithness. While it is possible that the long interval between the records of 1914 and 2004 reflects the rarity of the polecat in Scotland, it has raised the possibility that the species was reintroduced covertly. Such reintroductions have occurred elsewhere in Britain (Birks and Kitchener, 1999). Here, we use the method of Solow and Smith (2005) to assess the exceptionality of the 2004 record.

Let $t_1 > t_2 > \cdots > t_k$ be the k most recent record times of a species. The basic assumption of Solow and Smith (2005) is that these represent the k largest values of a larger collection of values generated from a distribution from the Gumbel domain of attraction. Such distributions include the normal, lognormal, and gamma, but not the uniform or Cauchy. Suppose that a new specimen is recorded at time y. Interest centers on assessing the exceptionality of the new record. Solow

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and Smith (2005) showed that, under the null hypothesis that the new record was generated by the same process as the earlier ones, the quantity,

$$S_k = \frac{y - t_1}{(y - t_1) + \sum_{j=1}^{k-1} (j+1)(t_j - t_{j+1})}, \quad (1)$$

has a β distribution with parameters 1 and $k-1$ so that the p-value corresponding to an observed value s_k is

$$p = (1 - s_k)^{k-1}. \quad (2)$$

We applied this test using the $k = 5$ most recent verifiable records of the polecat in Scotland. The dates of these records are 1914, 1907, 1906, 1905, and 1903. The value of s_k is 0.74 and the corresponding p-value is 0.004. In addition to records that can be verified from specimens, there are a number of other records of varying plausibility. Three plausible records date from 1928, 1916, and 1912. Keeping k at five and including these records reduces s_k to 0.55 and increases the p-value to 0.042. These results suggest that the rediscovery of the polecat in Scotland reflects its reintroduction rather than its survival at low abundance.

The reappearance after a long interval of so-called Lazarus taxa (Keith and Burgman, 2004) raises the question: Why has the species gone unrecorded? In some cases, rediscovery may reflect rarity or lack of recording effort, while in others it may be the result of recolonisation or reintroduction. In the absence of more detailed biological information, the statistical method described here can be useful in shedding light on this question.

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