

The Leach's Storm-Petrel Population Size of Vestmannaeyjar, Iceland

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Abstract

A case of commensalistic breeding association between Leach's Storm-Petrel (*Oceanodroma leucorhoa*) and Atlantic puffin (*Fratercula arctica*) is reported here for the first time. This association was utilized to calculate the Europe largest Leach's Storm-Petrel population residing in the Vestmannaeyjar archipelago to be 178.900 ± 34.100 pairs ($\pm 95\%$ confidence limits).

The breeding distribution of both species in the treeless Elliðaey Island is significantly and highly associated. The species breeding densities are also significantly and highly correlated. In a pilot study 20 (57%) of 35 Leach's storm-petrel burrows were dug from within puffin burrows.

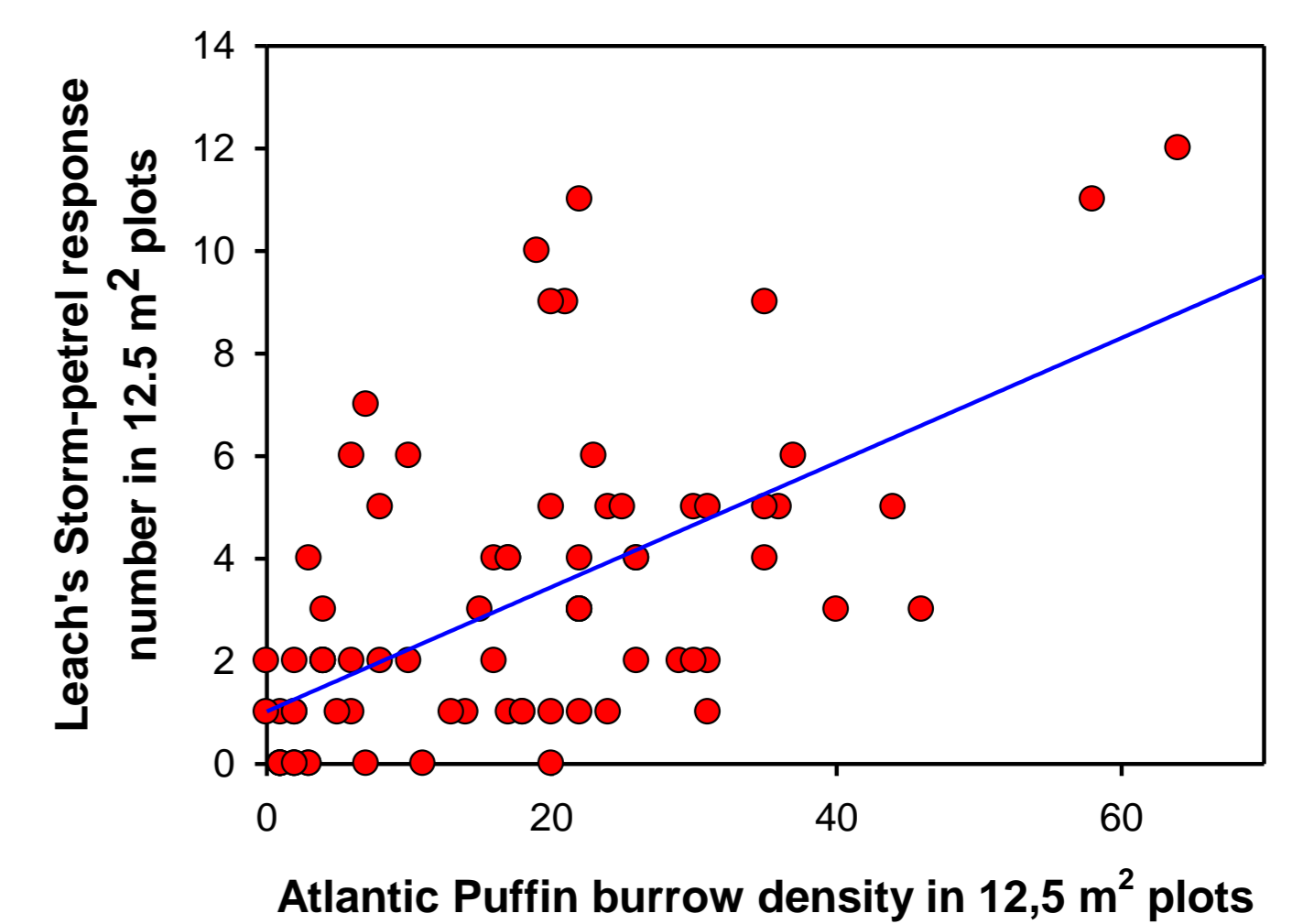
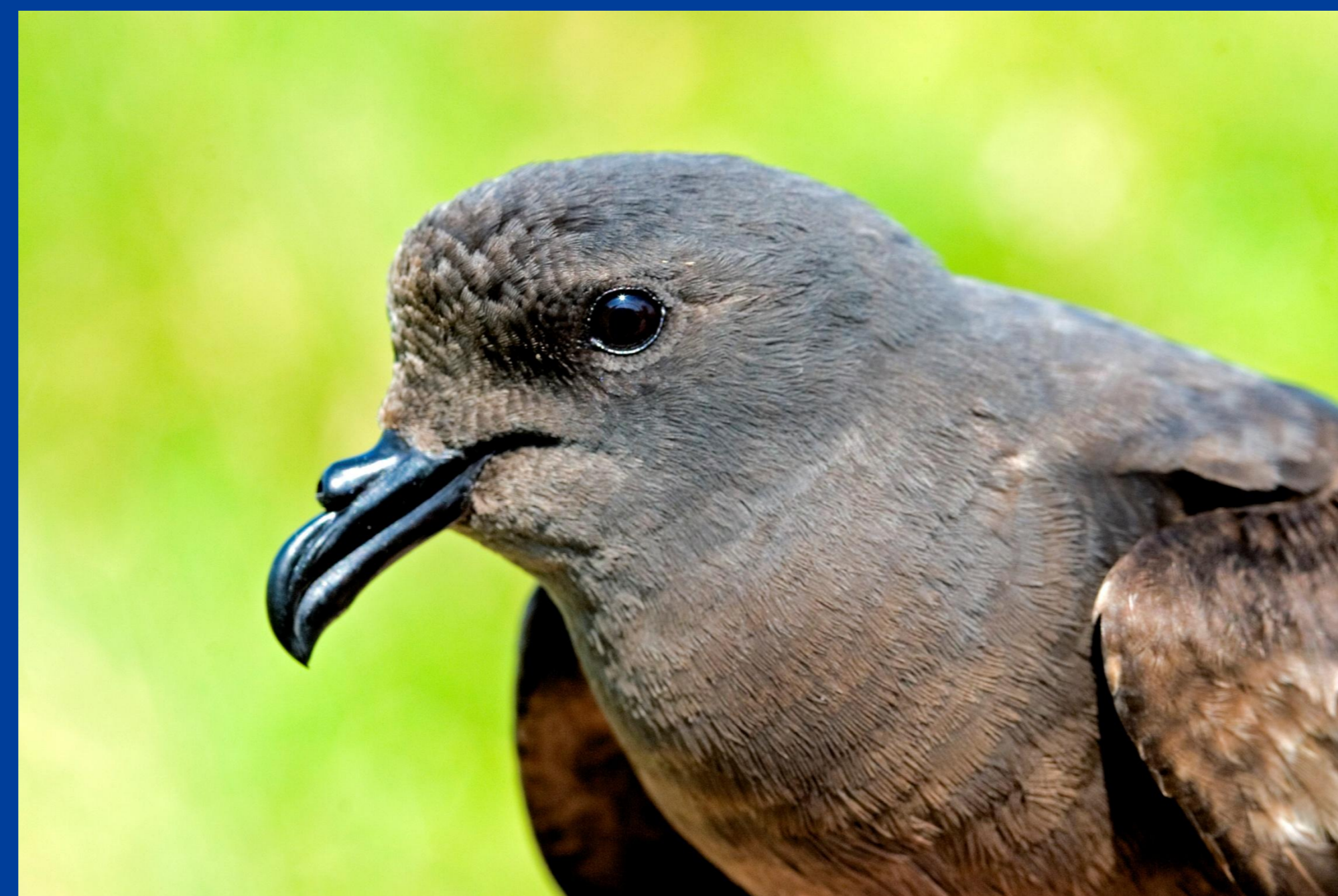


Fig. 5. Correlation of Leach's Storm-Petrel and the Atlantic Puffin breeding densities, omitting double zeros ($r_p=0.59$, $P<0.0001$, $v=78$. Regression: $F_{1,78}=41.715$, $P<0.0001$, $R^2=34.8\%$).

Methods

► **Breeding distribution** of Leach's Storm-Petrel and Atlantic puffin were mapped in 162 equidistant 400 m² plots (Fig. 1 & 3) in Elliðaey Island (63°28'N, 20°11'W) in June 1991.

► **Breeding density** of both species was measured in Elliðaey Island using two transects covering 4.600 m² by counting all puffin burrows and replies to a playback of locally recorded male Leach's storm-petrel chatter and purr calls (James & Robertson 1985, Taoka et al. 1989b, a, Ratcliffe et al. 1998)

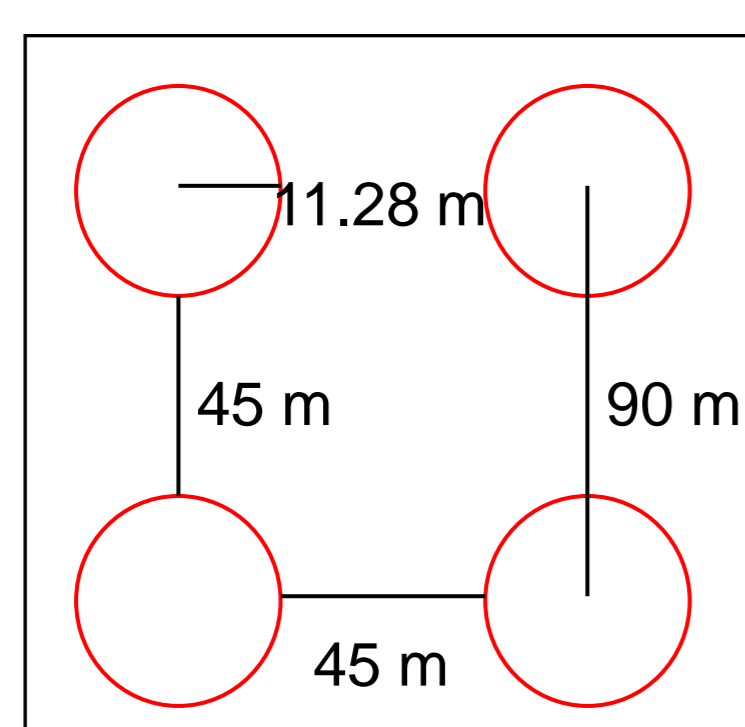


Fig. 1. Dimensions and layout of circular plots for mapping the breeding distribution shown in Fig. 3.

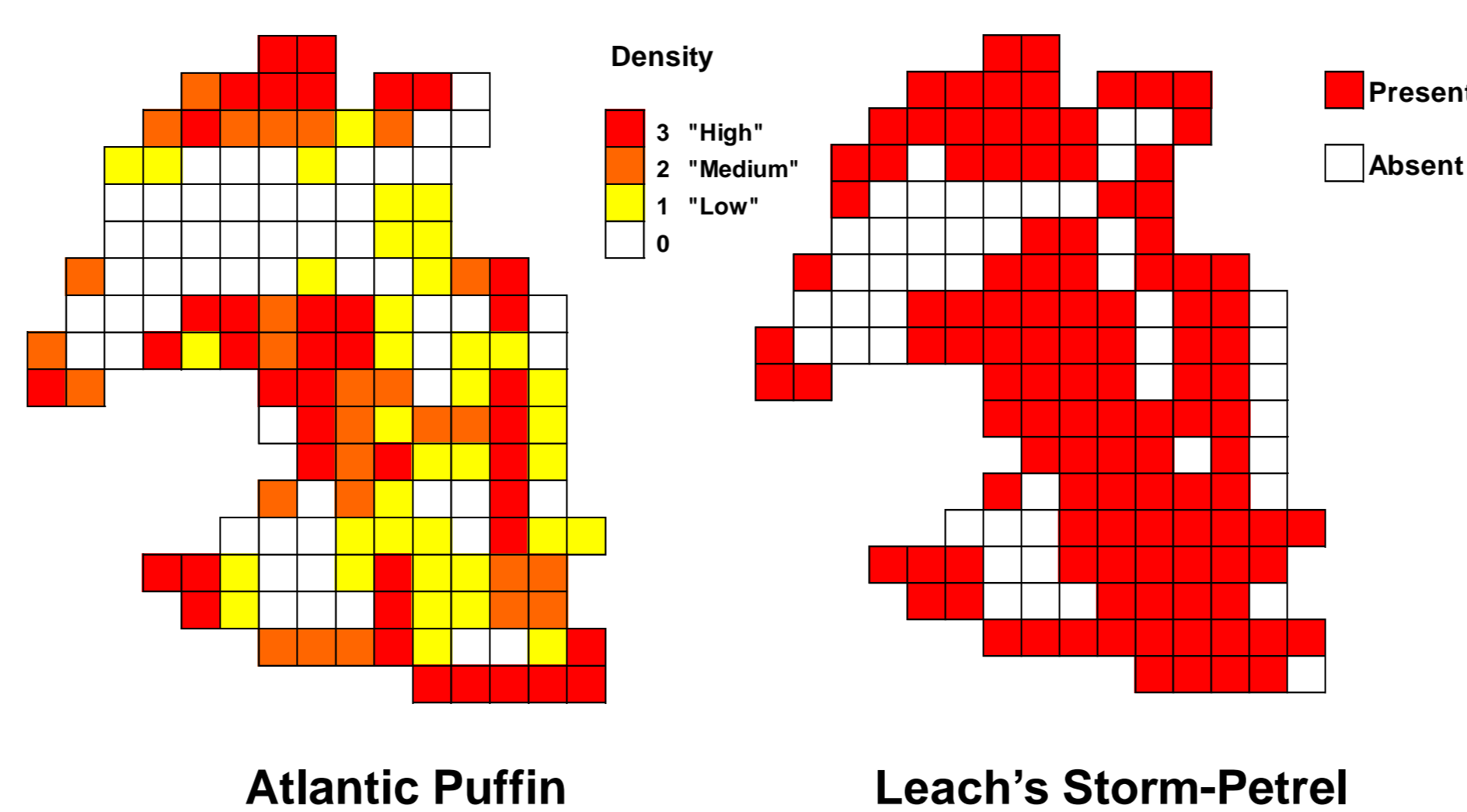


Fig. 3. Breeding distributions of both species on Elliðaey Island are significantly associated ($\chi^2=64.256$, $d.f.=1$, $P<0.0001$).



Table 1. Indexes of breeding association: are high!

Index	Value (range: 0-1)
Ochiai	0.874
Dice	0.873
Jaccard	0.774

Fig. 4. Bottom to top: Vestmannaeyjar town; "new lava field" from the 1973 eruption; Elliðaey Island; and Eyjafjallajökull glacier.



Leach's Storm-Petrel Population size

- The ratio of Leach's Storm-Petrel colony area to that of Atlantic Puffin's in Elliðaey Island is 1.0952.
- Total breeding surface area of all colonies corrected for landscape (slope) is 725.361 m².
- Leach's Storm-Petrel mean response density in Elliðaey Island is 0.246 m² (0.0507 SE).
- Estimated Leach's Storm-Petrel population size: **178.877 34.107 pairs** ($\pm 95\%$ confidence limits).

Table 2. Leach's Storm-Petrel population registry

Island/s	Pairs	95% C.I.
Álsey	47.325	9.760
Bjarnarey	45.106	9.301
Elliðaey	44.313	9.138
Suðurey	20.464	4.220
Brandur	9.247	1.906
Hellisey	5.394	1.112
Smáeyjar (4 islands)	7.027	1.449

Results

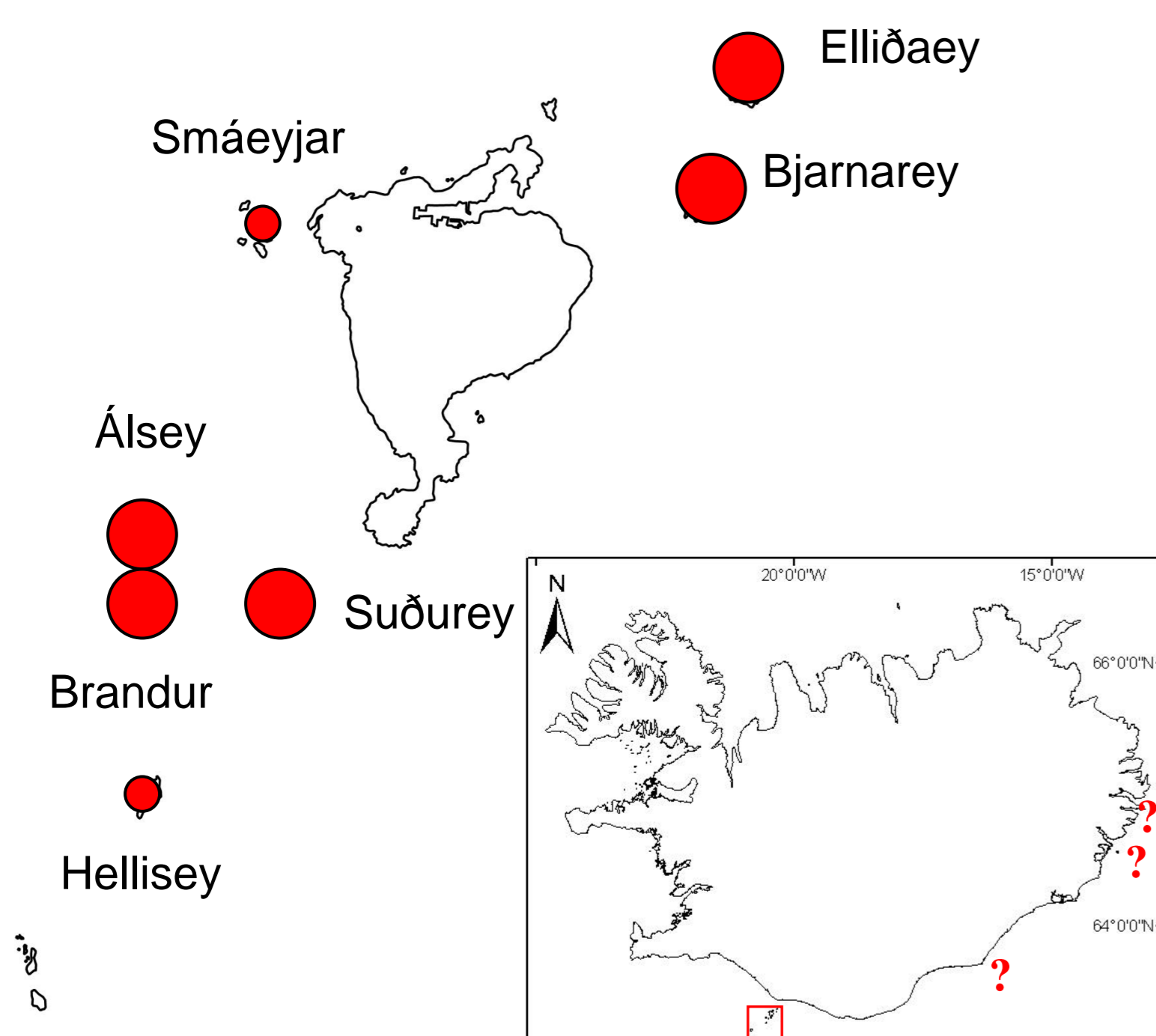


Fig. 2. Leach's Storm-Petrel breeding distribution in Vestmannaeyjar (see Table 2.).

References

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