

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.

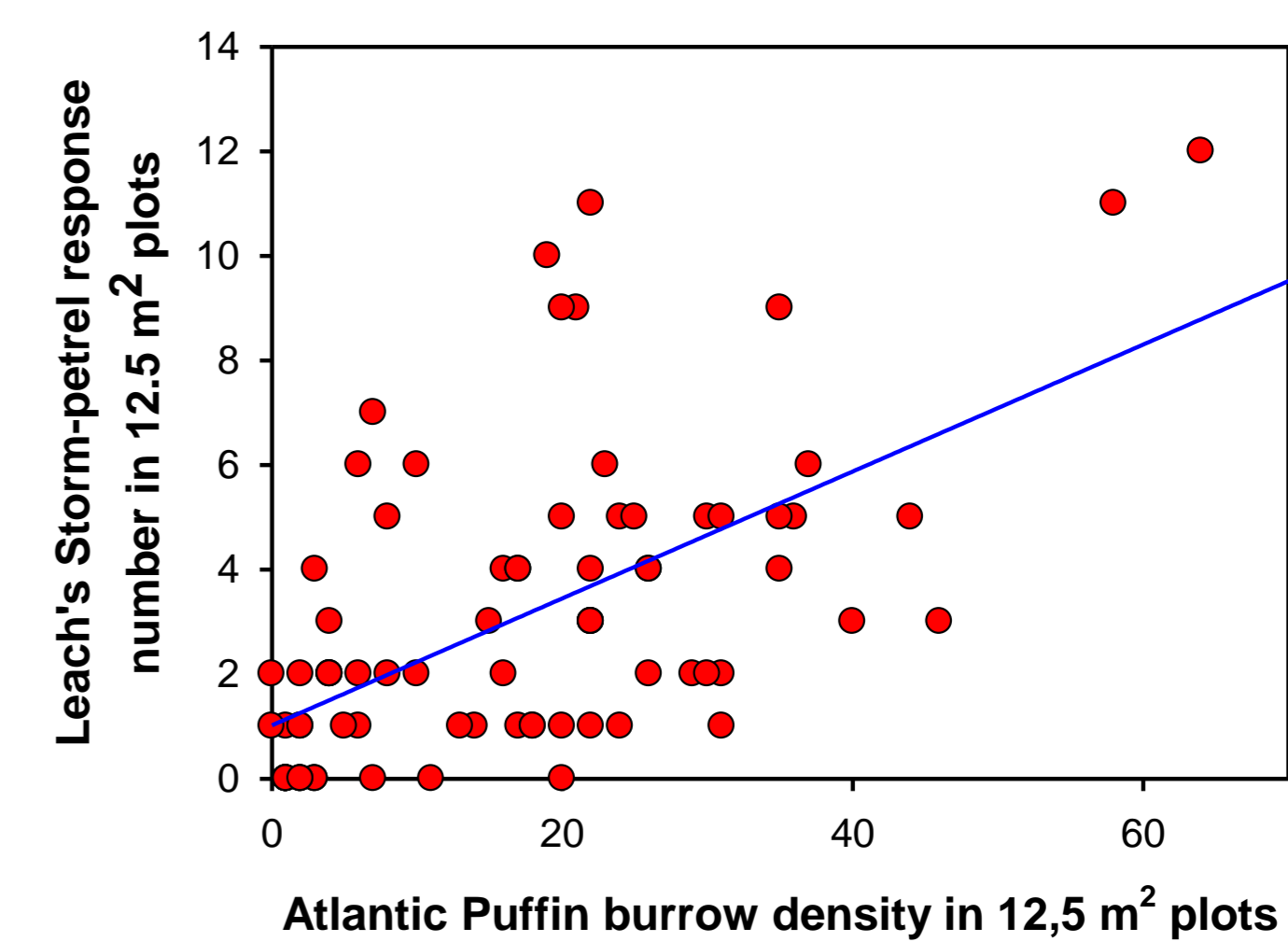
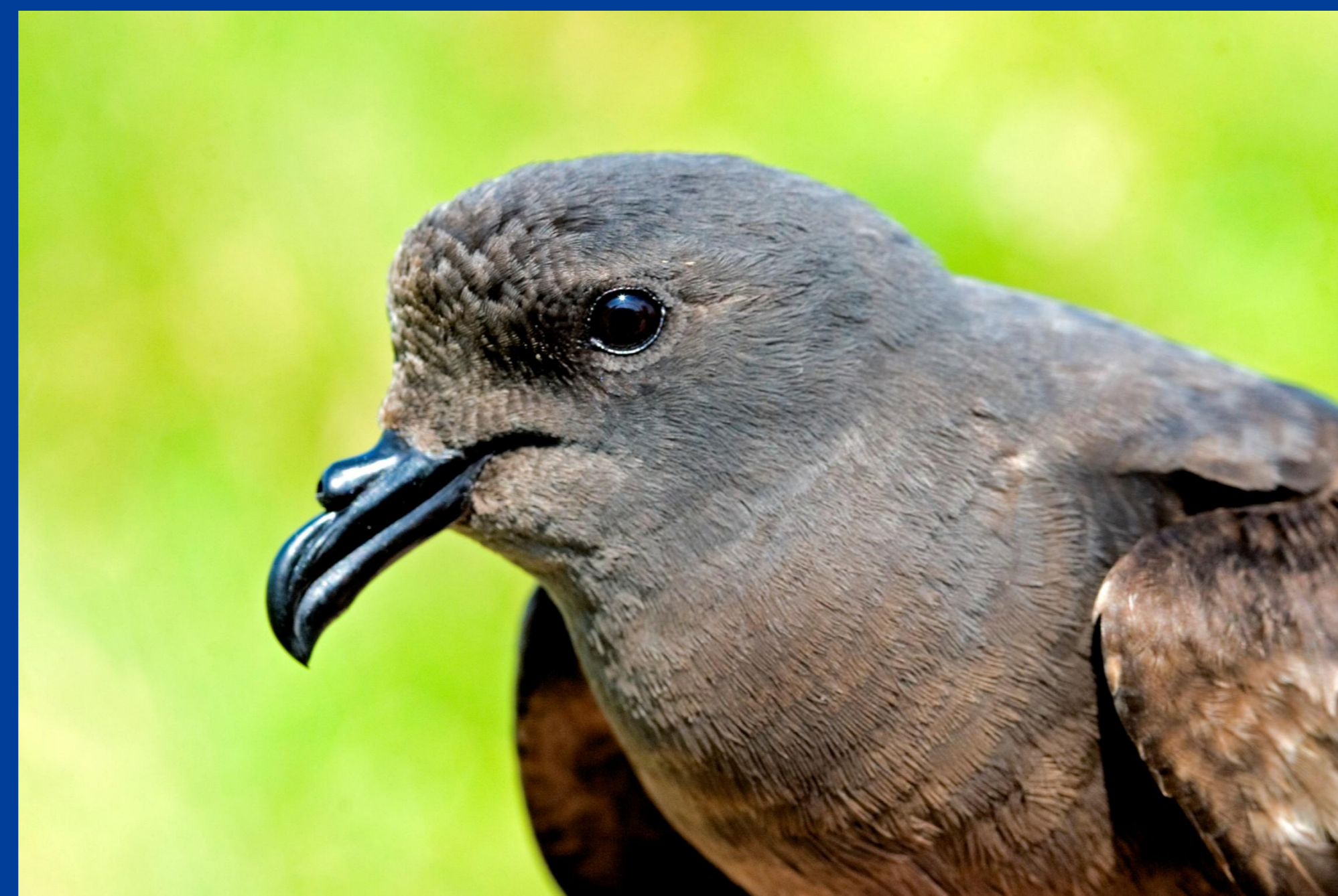


Fig. 5. Correlation of Leach's Storm-Petrel and the Atlantic Puffin breeding densities, omitting double zeros ($r_p=0.59$, $P<0.0001$, $v=78$. Regression: $F_{1, 78}=41.715$, $P<0.0001$, $R^2=34.8\%$).

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)

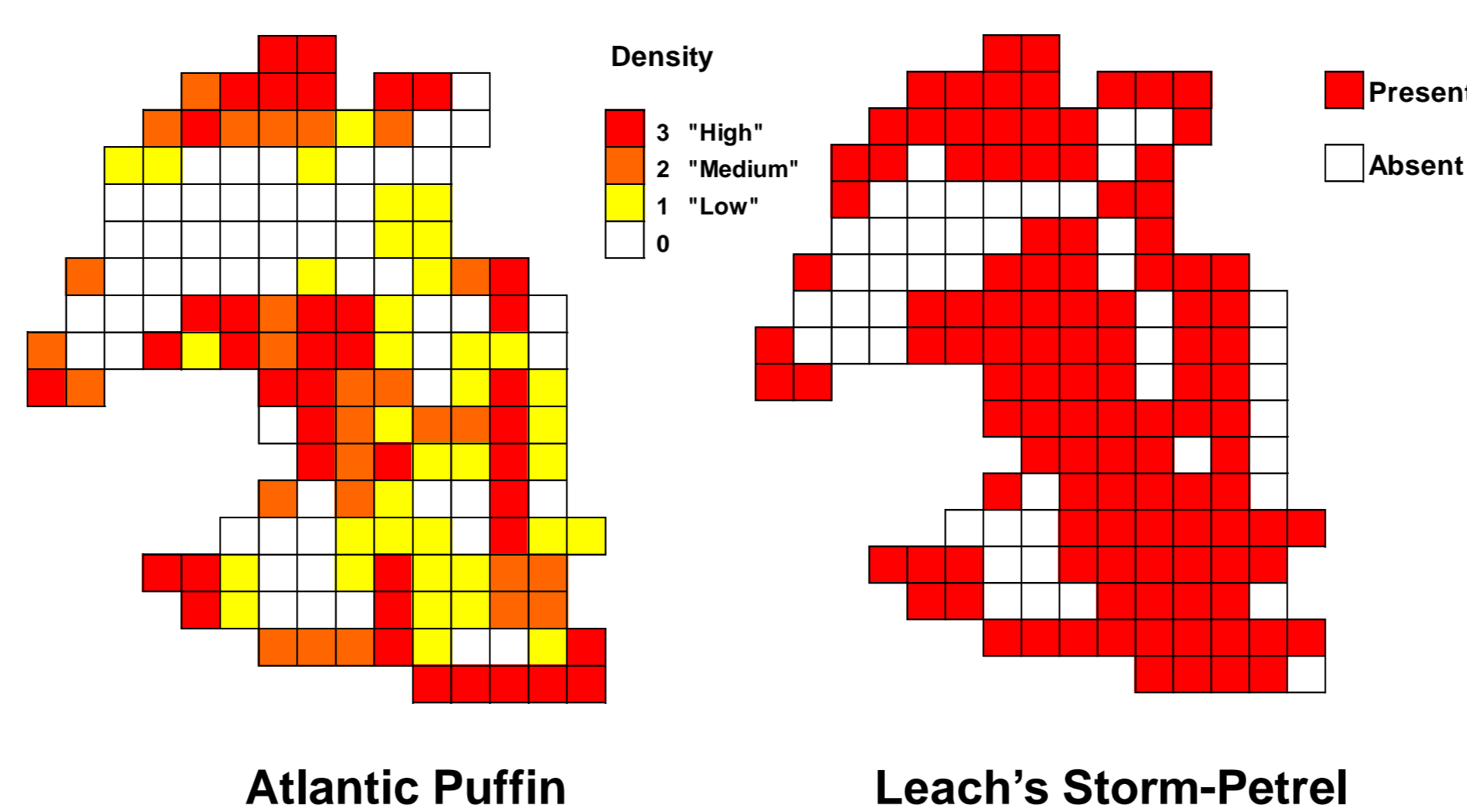


Fig. 3. Breeding distributions of both species on Elliðaey Island are significantly associated ($\chi^2=64.256$, $d.f.=1$, $P<0.0001$).



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).

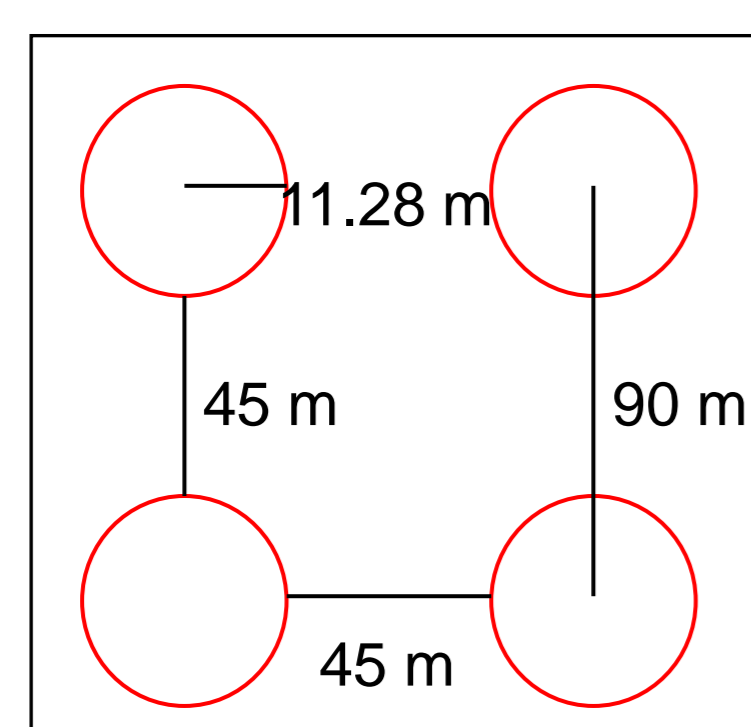


Fig. 1. Dimensions and layout of circular plots for mapping the breeding distribution shown in Fig. 3.

Table 1. Indexes of breeding association: are high!

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

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

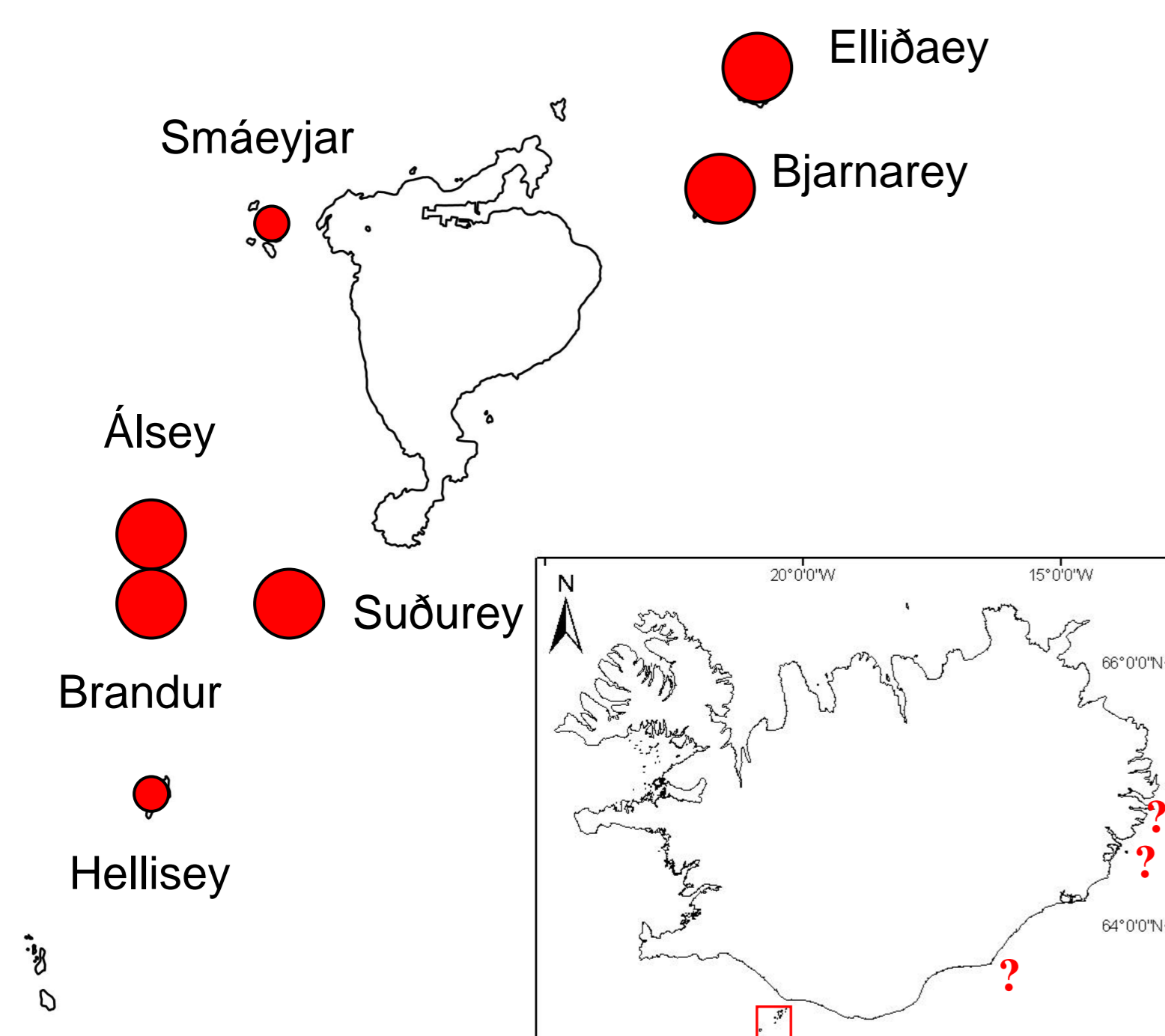


Fig. 2. Leach's Storm-Petrel breeding distribution in Vestmannaeyjar (see Table 2.).

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



References

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