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Effects of Habitat Fragmentation *per se* on the Genetic Diversity of the Glanville Fritillary Butterfly

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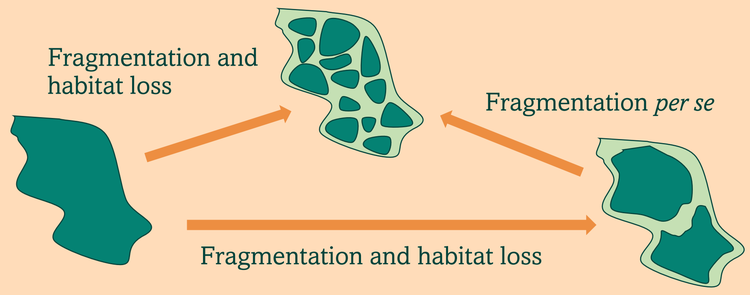
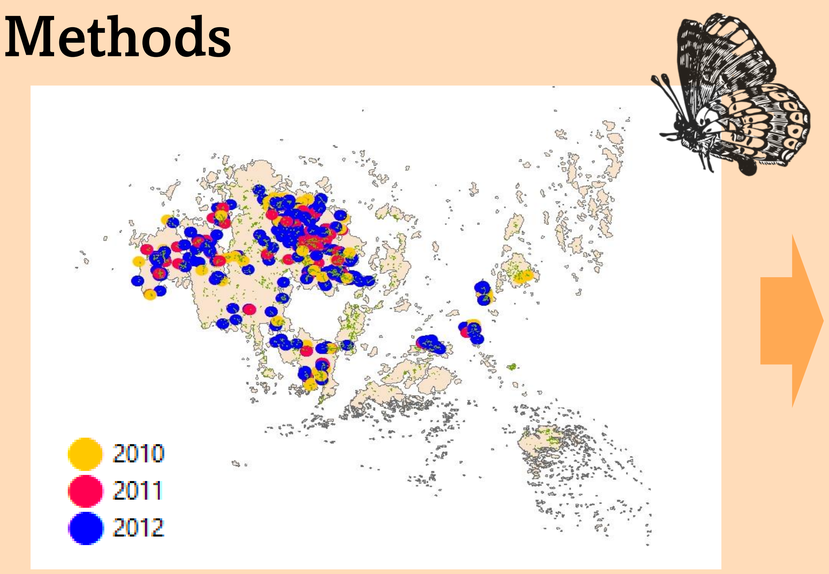
Background

Fragmentation and habitat loss are usually mentioned together as the main causes of **biodiversity loss**. Both processes usually take place together, making it difficult to observe their effects separately. We know that habitat loss decreases biodiversity, but the effect of fragmentation per se is not clear. According to the Habitat Amount hypothesis[1], the fragmentation effect is negligible or even positive for diversity. The debate around this hypothesis has been focused on the consequences for species diversity, but fragmentation could also have an impact on diversity at an intraspecific scale: **genetic diversity (GD).**

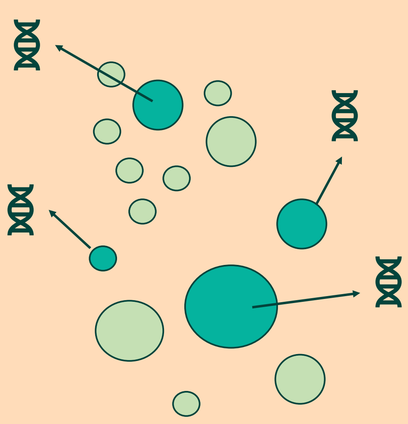
Our **aim** is to test if habitat fragmentation has an effect on genetic diversity independently from habitat amount.



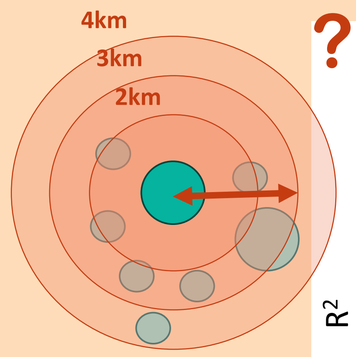
Methods

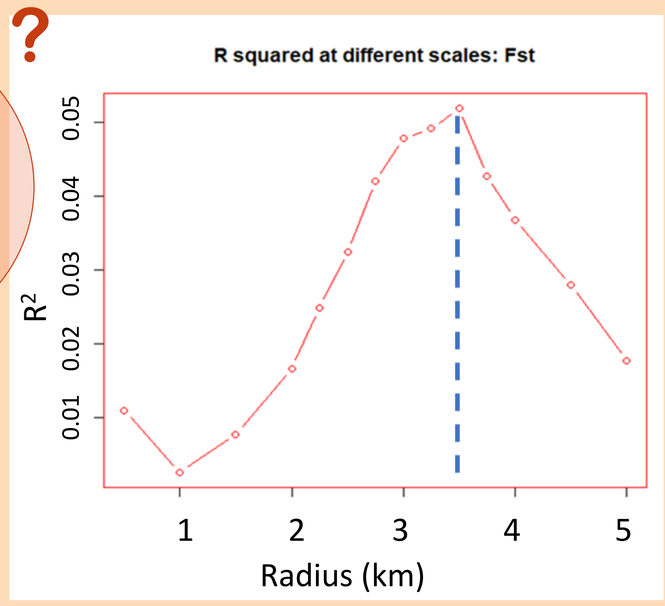


We used genetic samples from the *Melitea cinxia* metapopulation in the Åland islands from 2011 and 2012.



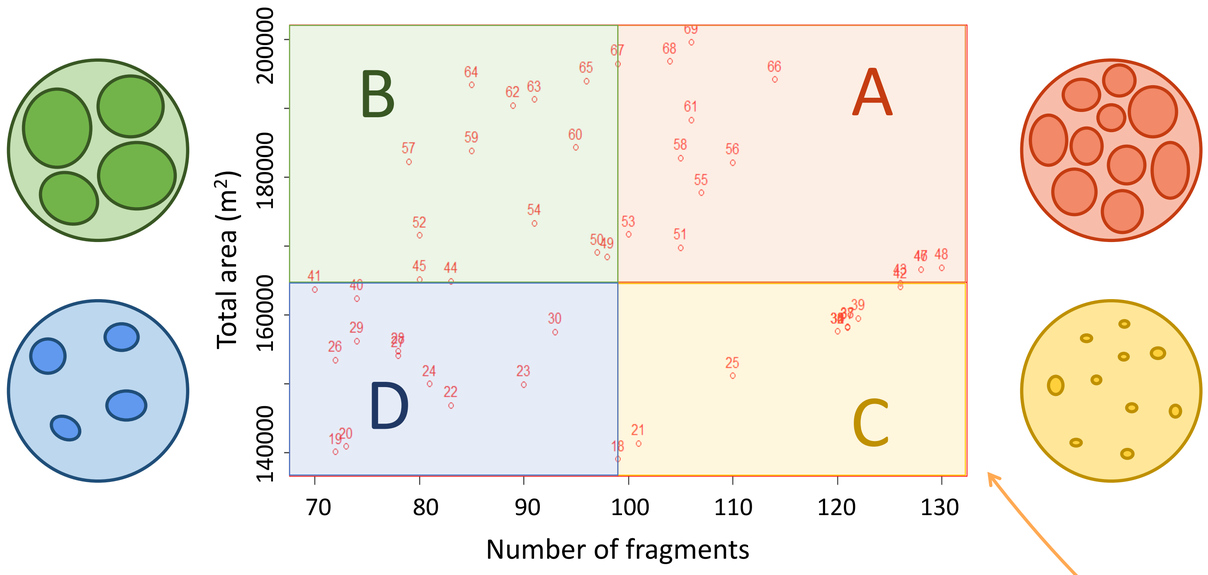
We calculated Genetic Diversity indices (Fis, Fst, Ho and Hs) in focal habitat patches. We used 40 neutral SNPS.



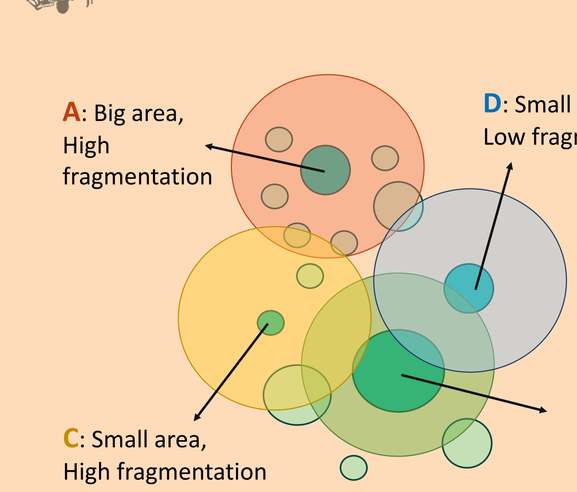


How big is the area where we measure the landscape characteristics? We studied at what scale we observed the highest correlation between the GD and the number of fragments. We found a peak when using a radius of **3.5km** around the focal patch.

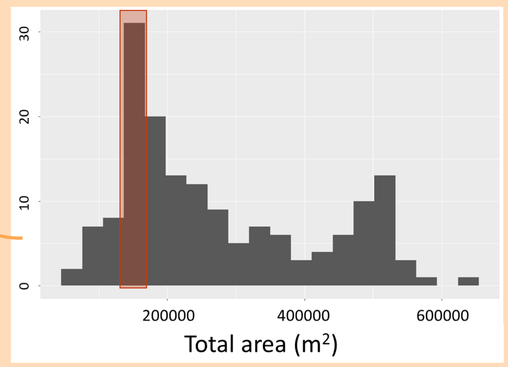
Results:



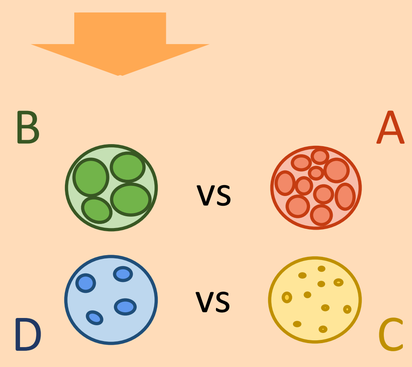
Habitat amount and number of fragments in the landscape around the focal patches. Data from 2012. Correlation between total area and number of fragments: 0.08



Following Martin et al. [2], we measured the habitat amount and number of patches in the landscape around each focal patch.

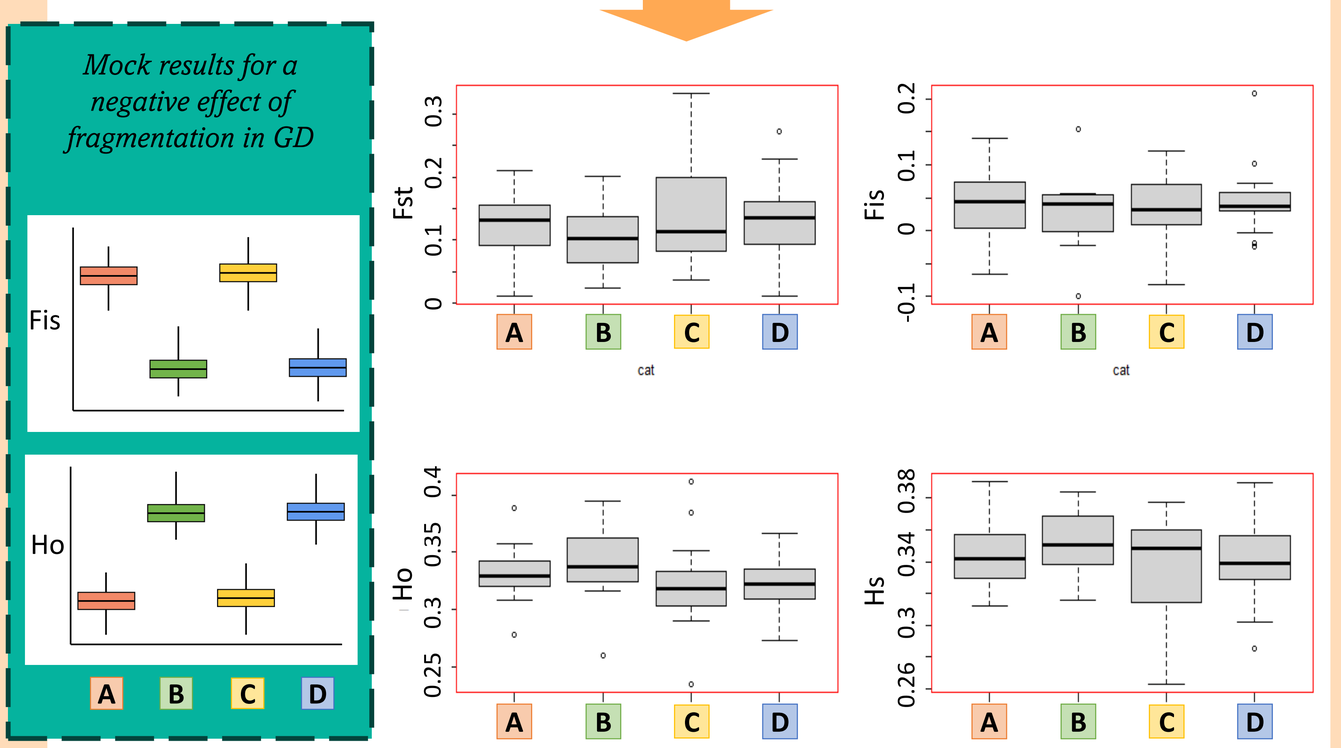


By selecting data from a narrow range of total area, we can reduce the correlation between habitat amount and number of fragments.



We compared areas with similar total habitat amount, but with variation in the number of patches. This way, we can measure the effect of fragmentation *per se*.

Mock results for a negative effect of fragmentation in GD



Conclusions

Our preliminary results suggest that fragmentation doesn't noticeably affect genetic diversity, **supporting the habitat amount hypothesis**.

Nonetheless, we also didn't find an effect of the habitat amount, suggesting that our data might not have enough contrast to observe the fragmentation effect.

1: Fahrig, L. (2013). Rethinking patch size and isolation effects: the habitat amount hypothesis. *Journal of Biogeography*, 40(9), 1649-1663
2: Martin, A. E., Bennett, J. R., & Fahrig, L. (2021). Habitat fragmentation. *The Routledge Handbook of Landscape Ecology*, 118-139