

Wild at risk : Tracking hybridisation between wildcat and domestic cat in Luxembourg

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Introduction

As Luxembourg's only native wild feline, the wildcat (*Felis silvestris*) plays a crucial role in both forest ecosystems and open landscapes.

However, hybridisation with domestic cats threatens the **genetic integrity** of wildcat populations, creating challenges for **conservation**.

Methodology

1,345 hair samples since 2011
Genetic markers : Microsatellites
SNPs
Stratified random sampling : 3 subsets
NewHybrids

Hybrid categories :

F1 wildcat × domestic cat
F2 F1 × F1
Backcross
Bx. *F. sil.* = F1/F2 × wildcat
Bx. *F. cat.* = F1/F2 × domestic cat



Monitor wildcat populations in Luxembourg



Assess the prevalence of **hybridisation** in wildcat populations



Results

Trends in hybrid detection over time : 3-year moving average

The percentage of hybrids detected, when smoothed using a 3-year moving average to account for all sampling sites, remains consistently **low, fluctuating between 1% and 5%** (Fig. 1).

However, when considering **annual variations tied to site-specific sampling**, hybrid rates range from 1% to 9%, with an exceptional peak at 17% in 2022. This peak likely reflects the influence of the sampled subset rather than a broader trend. These results align with previous studies.

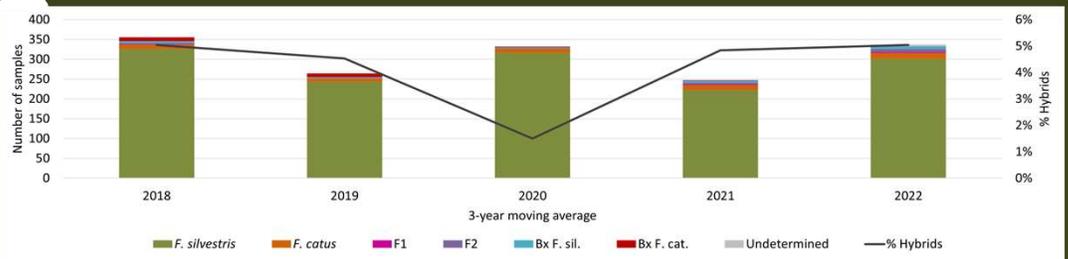


Figure 1 : Moving average evolution of the % of annual detection of hybrids in samples collected in Luxembourg (2018-2022), by type of hybrid.

Geographic distribution of hybrids (2017-2023)

Hybrid cats are **unevenly** distributed across Luxembourg, with some forest-dense areas being less affected (Fig.2).

Although **hybrid locations differ** each year, we hypothesise that urban areas, where domestic and wildcat populations meet, could be consistently driving hybridisation hotspots.

Perspectives and conclusions

Combining genetic data with **landscape genetics** will clarify how human infrastructures affects population genetics.

While the current hybridisation rate is not alarming, ongoing **monitoring** is essential to prevent genetic dilution, which could impair wildcats' adaptation to environmental changes and increase the risk of local extinction.

Measures like sterilisation, public awareness campaigns, and ecological corridors could help reduce hybridisation risks.

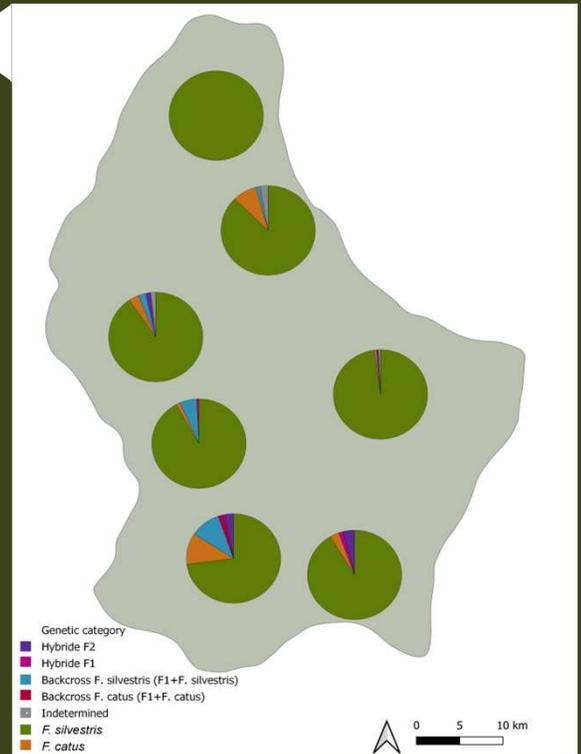


Figure 2 : Map of Luxembourg showing the proportion of pure wildcats (green), pure domestic cats (orange) and hybrids categories (2017-2023), based on NewHybrids analysis.

Preserving the wildcat's genetic identity today safeguards Luxembourg's biodiversity for tomorrow

Acknowledgments

This project is conducted in collaboration with the Luxembourg Institute of Science and Technology (LIST) and the Ministry of Environment, Climate, and Biodiversity.

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