

Non-invasive molecular monitoring as an ethical imperative in wildlife research: the case of the *Pyrenean desman*

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INTRODUCTION & AIM

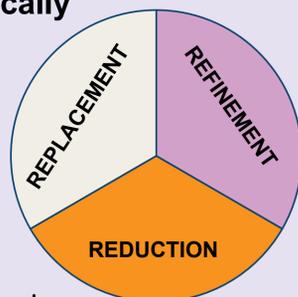
INTRODUCTION

Traditional capture-based protocols induce:

- physiological stress
- disrupt natural behaviour
- risk injury or mortality

Threatened and elusive species require **ethically superior** research alternatives

- Non-invasive molecular tools align with the 3Rs principles



AIM

- Assess the viability of non-invasive methods as ethical alternatives
- Monitor *G. pyrenaicus* populations in Extremadura without direct animal contact
- Detect interactions with the invasive American mink (*Neovison vison*)
- Evaluate eDNA as a central ethical monitoring tool

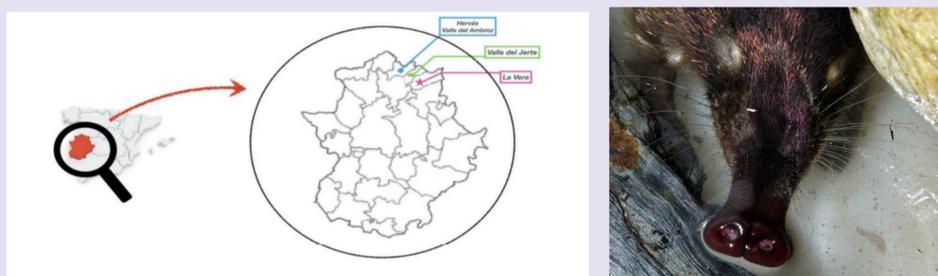
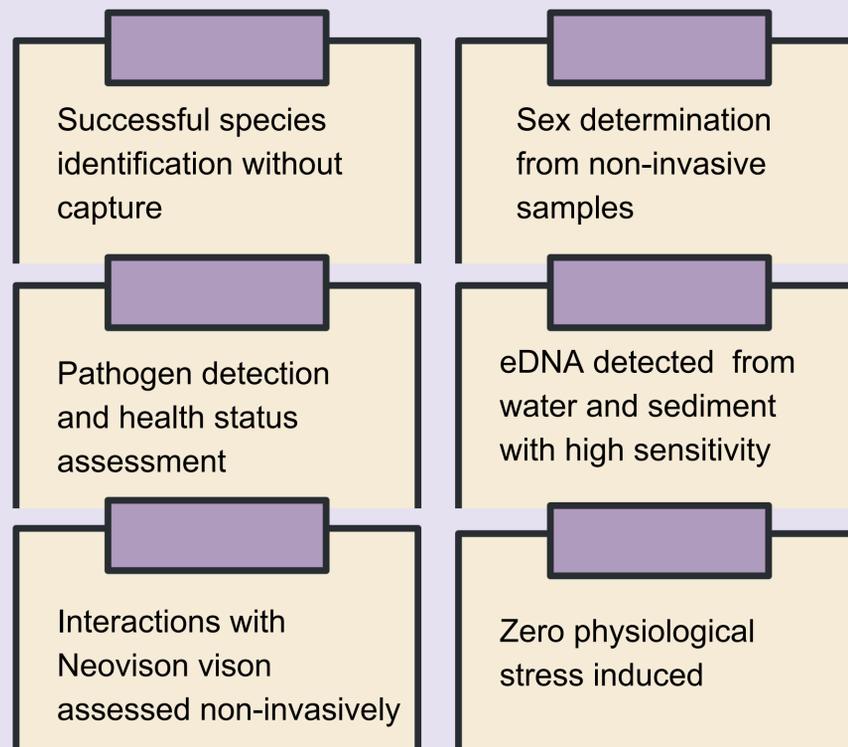


Figure 1. Map of Spain (left) and Extremadura (right)

Figure 2. *Galemys pyrenaicus*.

RESULTS & DISCUSSION

RESULTS



DISCUSSION

eDNA provided

- Presence distribution
- Community-level data

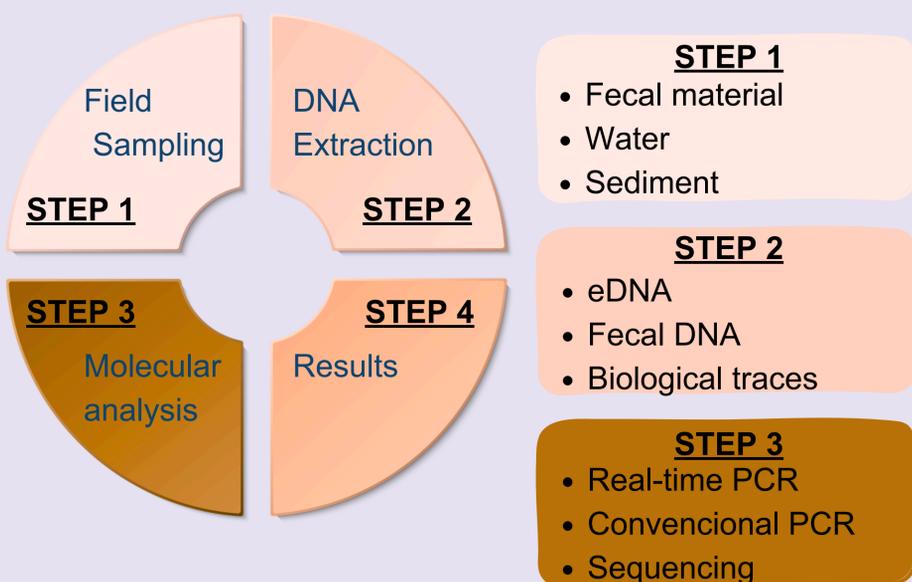
without any direct animal contact

Non-invasive techniques proved not merely

methodologically efficient but

ethically superior

METHOD



CONCLUSION

- Non-invasive molecular approaches are ethically and methodologically superior while maintaining full scientific rigour
- Integrating eDNA and molecular tools into conservation programs is not only viable but an ethical imperative
- Scientific rigour and animal welfare are complementary, not conflicting

FUTURE WORK / REFERENCES

