Effect of Livestock Guardian Dogs on Biodiversity Conservation and Extensive Livestock Farming

UAB Universitat Autònoma de Barcelona

Faculty of Veterinary Medicine
Rita Mesa Farran
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Fig 1. Bear *(Ursus arctos)* in the Catalan Pyrenees (Government of Catalonia, mediambient.gencat.cat.)



Fig 2. Spanish Mastiff (Photograph by I. Carbonell, 2009)



Fig 3. Wolf (*Canis lupus*) in the Catalan Pyrenees (Government of Catalonia, mediambient.gencat.cat.)

Background

Wolf and brown bear are recolonising the Catalan Pyrenees — the first wolf litter in 100+ years was confirmed in autumn 2025.

Extensive livestock farming has long been a cornerstone of Catalan rural society, yet the sector is currently facing significant challenges that threaten its continuity.

Objective

This review analyses how livestock guardian dogs (LGDs) can facilitate coexistence between carnivore conservation and extensive livestock farming.

Bear population — Catalan Pyrenees

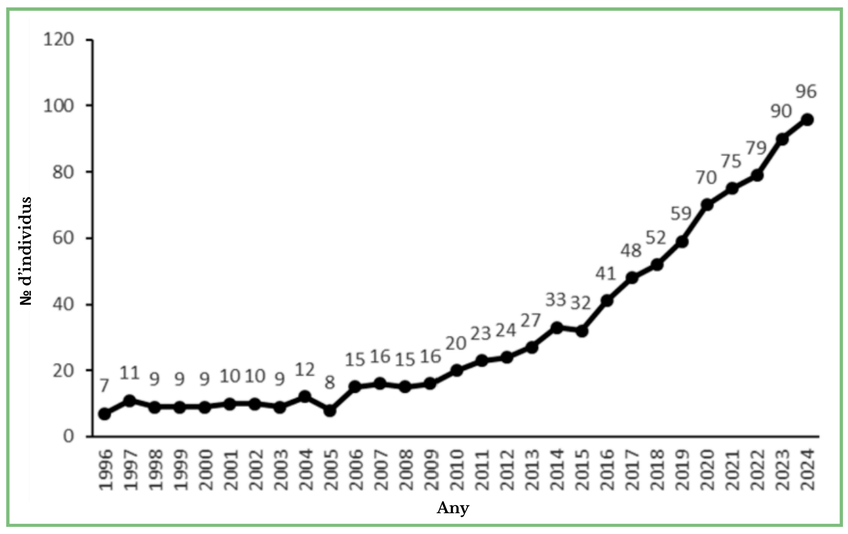

Table 1. Evolution of the brown bear population in the Catalan Pyrenees (Government of Catalonia, Department of Territory, Housing and Ecological Transition, 2025)

Large carnivores

Keystone species

Regulate trophic cascades — their loss can collapse entire ecosystems over decades.

Actual problems

Material conflicts

- Damage to crops and agricultural infrastructure
- Livestock mortality and reduced production yields
- Direct risk to human safety

Human conflict

Pyrenean farmers show strong opposition — especially to wolves. Many consider abandoning farming activity

LGD

Dogs genetically selected over thousands of years to protect extensive livestock from predation and damage.
Most effective non-lethal predation prevention tool, alongside electric fencing.

Broader positive impact

- Supports biodiversity & landscape
- Reduces wildfire risk
- Enables wildlife tourism

Limitations & risks

Farmer

Society

Other concerns

Conclusions

1. LGDs reduce predation effectively but cannot eliminate attacks
   Number and distribution of dogs matter
2. In the Catalan Pyrenees, LGDs are key for coexistence given recent carnivore recolonisation
3. Maintaining extensive farming prevents biodiversity loss, landscape closure and wildfire risk
4. Carnivore return enables rural tourism and socioeconomic benefits for local communities
5. Most LGD-related problems can be prevented with early imprinting and proper management protocols
6. Combined adaptive strategies — not single measures — are essential for each specific area