

Effect of origin and experience on cattle habitat selection in mountainous rangelands

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Background

Adapted animals to mountainous rangelands

- Mountainous pastures are usually configured by heterogeneous landscapes, mostly by rough terrain and a great heterogeneity of quality forage distribution.
- Livestock have, consequently, to travel within steep slopes to access to different resources assuming a higher energy costs than in flat terrain.
- This phenomenon is exacerbated by individual variability, the genetic association with terrain use and site-related experience.

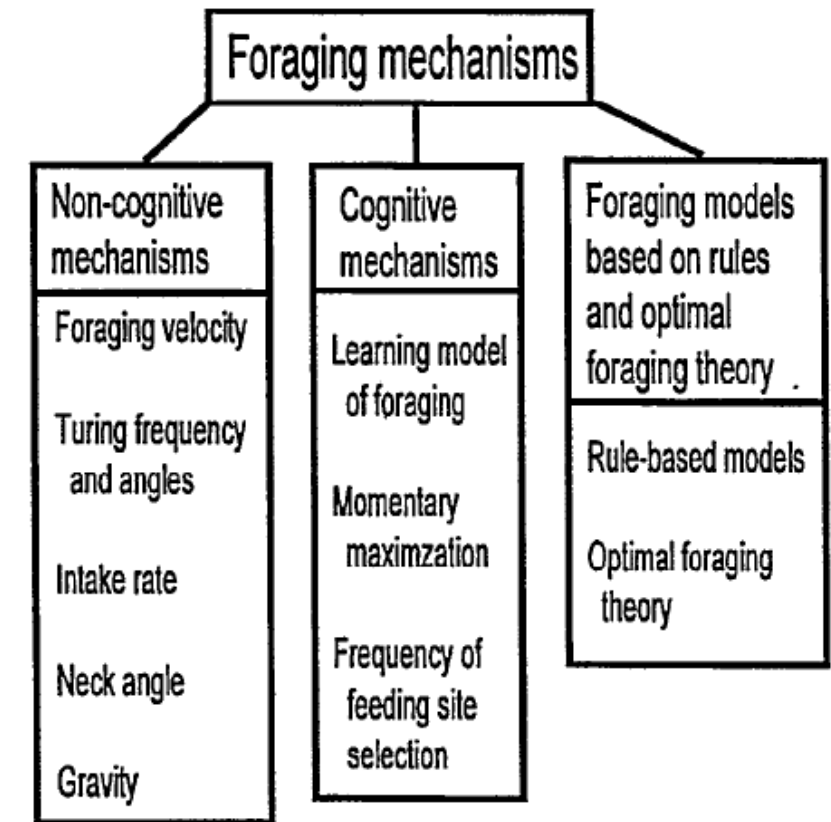
Some previous approaches

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Effect of Previous Experience on Grazing Patterns and Diet Selection of Brangus Cows in the Chihuahuan Desert

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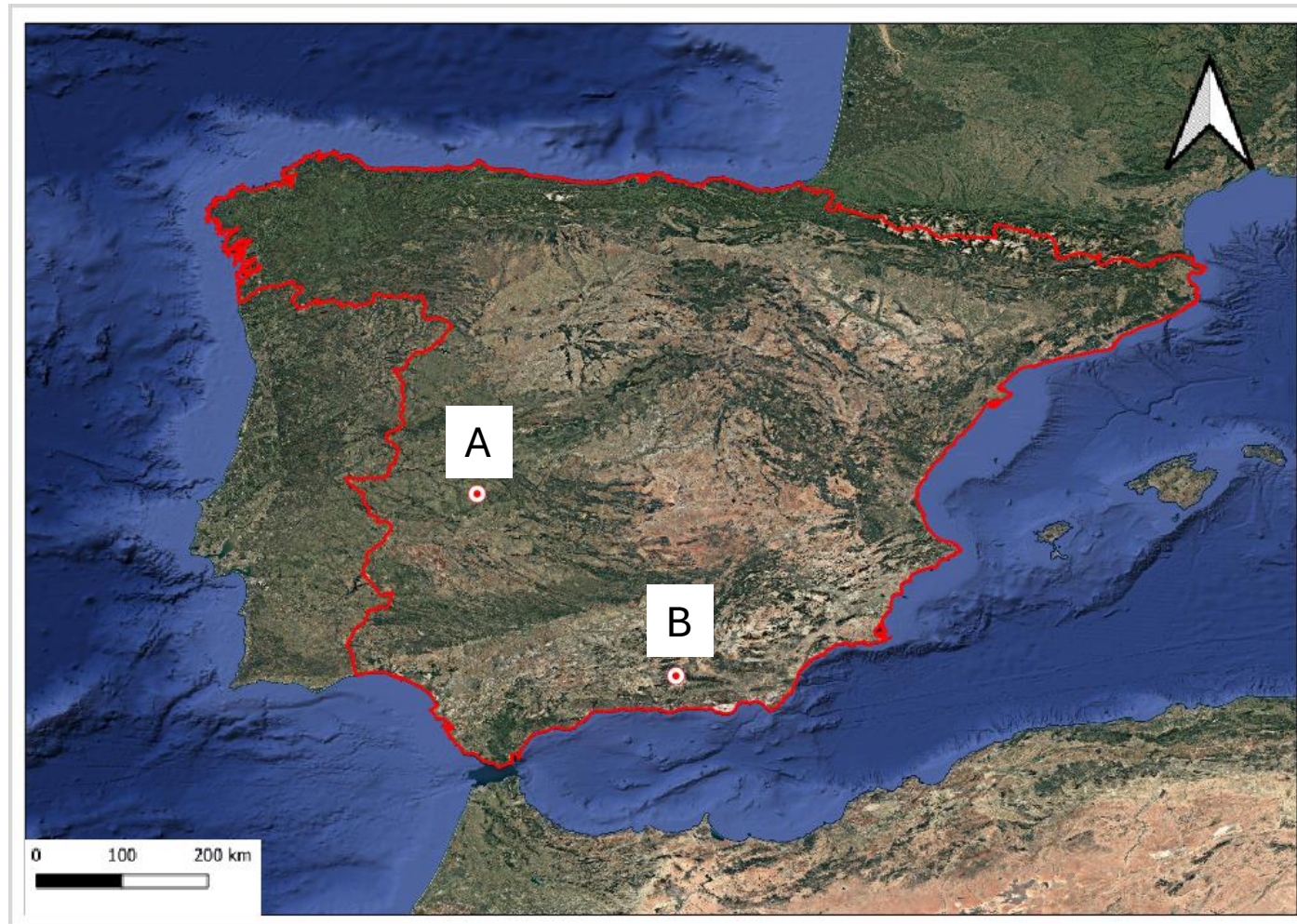
Bailey et al., 1996

Material and Methods

Case study

- Cows from a 50-cow *Berrenda en Colorado* herd located in mountainous pastures (≈ 4000 ha) in southeastern Spain.
- 20 cows were born at the farm location and the restant 30 were brought from a dehesa farm located a 470 km away.
- Study period consisted in the ice-free periods of 2023, 2024 and 2025.

From dehesa to mountain pastures



From gentle to rough terrain



Dehesa farm located in Spain



Mountainous pastures (case study)

Animal tracking



Data from 27 individual cows were fitted with comercial GNSS collars (10 in 2024 and 19 in 2025).

Foreign cow (13 different cows) and site-born cow (14 different cows)

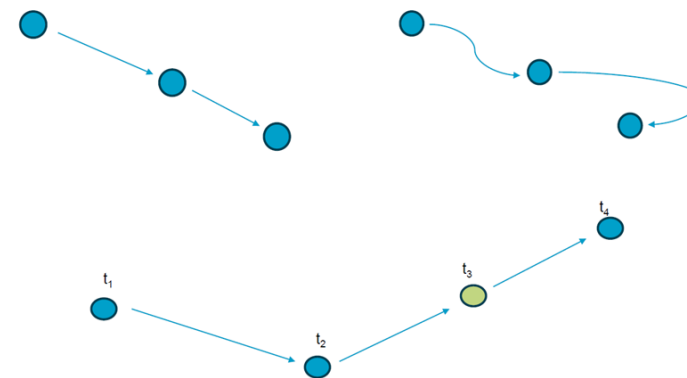
Cattle management

- Free-range grazing.
- Occasionally gathering, specially when calving season starts (June – September).
- Supplementation during lactation periods.



Data acquisition and preprocessing

- GNSS trackers worked under SigFox protocol.
- Time resolution was set at 30-min interval
- One SigFox antenna was deployed in farms to increase the data reception
- Data out from a 200-m buffer of farm perimeter was removed
- Days with not sufficient data or gaps higher than 3 hours were not considered
- Linear interpolation resampling was executed to keep a ceiling 30-min interval



Terrain characteristics

- Digital Elevation Model (5 meter resolution):
 - a. Slopes
 - b. Elevation
 - c. Sun exposures (North and South)
- Distances from water sources
- Vegetation classes based on Spanish National Protected Areas Network maps.

Binomial model

Variable	Type	Units
Site born	Dependant	Binary (0, 1)
Slope	Fixed	Z_transf (%)
Sun Exposure (N-S)	Fixed	Categorical
Elevation	Fixed	Z_transf (m.a.s.l)
Distance to water	Fixed	Z_transf (meters)
Season	Fixed	Categorical
Vegetation class	Fixed	Categorical
Year	Random	Factor
Interactions		
Vegetation class : (Slope, Elevation, Sun Exposure, Distance to water)		
Season : (Slope, Elevation, Sun Exposure, Distance to water)		
Slope: (Elevation, Sun Exposure, Distance to water)		

Results

Apparently, there is not a clear difference between farm and nonfarm born

- Results of the RSF showed that season has a significant effect on the selection behavior of cows depending on their origin.
- However, geomorphological variables did not show a significant effect, except for the interaction between slope and elevation, for which farm-born cows showed a negative trend (-0.07; SD = 0.01).
- Regarding vegetation, forested areas exhibited the strongest negative association with the selection of farm-born cows, both as a main effect (-4.61; SD = 1.81) and through the interactions with distance to water, elevation and aspect.

Conclusions and limitations

- Habitat selection differs between cows born and raised on the farm conditions and those introduced from external environments.
- Further research should assess additional spatial patterns, such as daily movement trajectories and home-range characteristics.
- Dam-offspring relations could explain the similarity of habitat selection patterns of cows.
- More comparissons between different generations of farm-born cows could show different resource selection patterns.

Thank you for your attention!

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