

GPS-based indicators to support grazing management in dairy sheep

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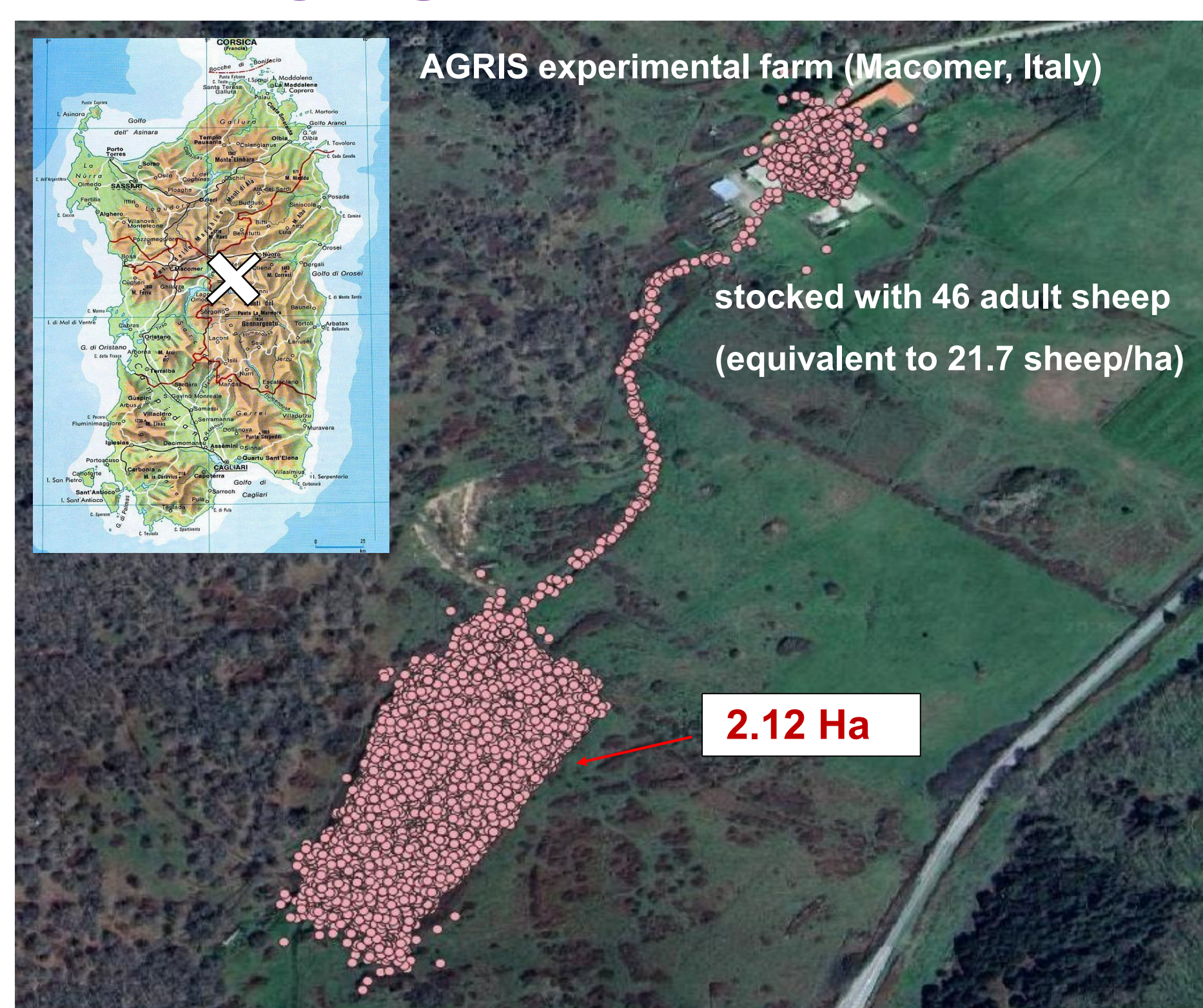


Grazing management relies on information about herbage availability, animal nutritional requirements, and how animals use pasture in space and time.

and GPS tracking offers opportunities to support grazing management decisions

AIMS To investigate the spatial and temporal patterns of pasture use across different seasons in a Mediterranean dairy sheep systems.

METHODS



GPS tracking data were collected from Nera di Arbus sheep, an indigenous Sardinian breed, in two sessions: spring (19 March–9 April 2025) and summer (26 June–5 July 2025).

In each monitoring period, four sheep were fitted with GPS collars programmed to record location, date, and time at 3-minute intervals.

Spatial pattern of pasture use was estimated by Individual Daily Utilization distribution 95% (UD95)

using the dynamic Brownian Bridge Movement Model implemented in the Move package in R (version 4.3.1).



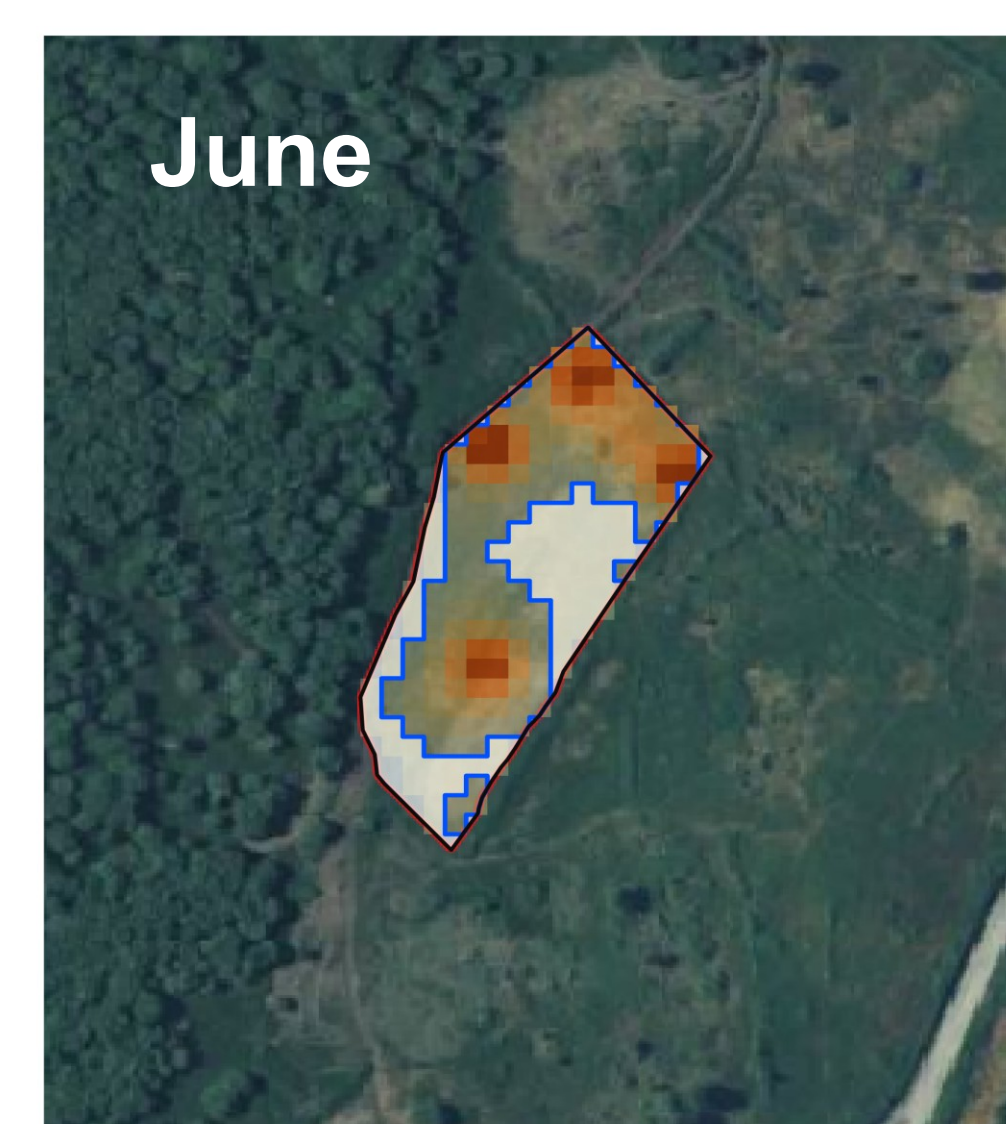
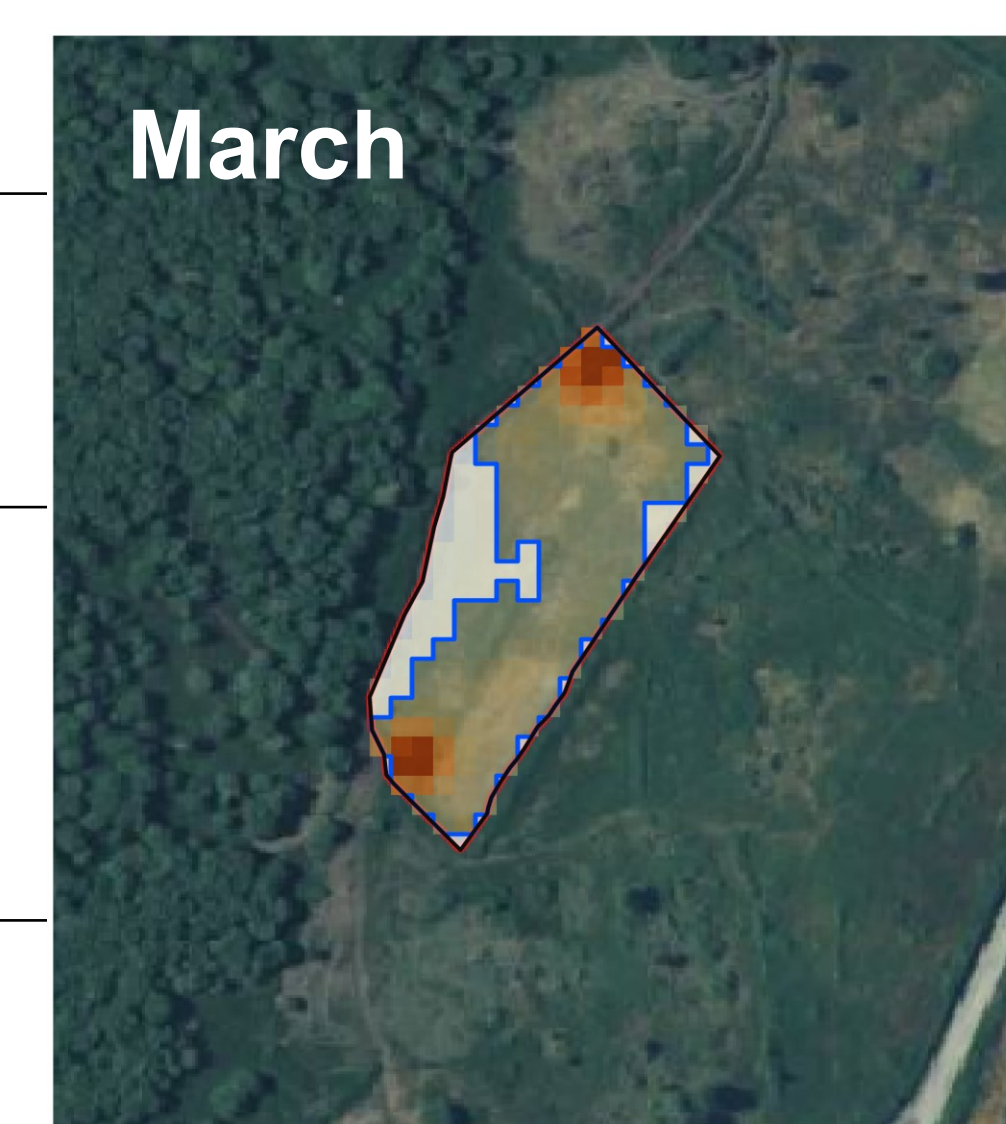
UD95 represents the area effectively used by an animal, as it contains 95% of its estimated space-use probability.

Temporal pattern of pasture use was estimated using the **Camargo's index (CI)** of space-use evenness

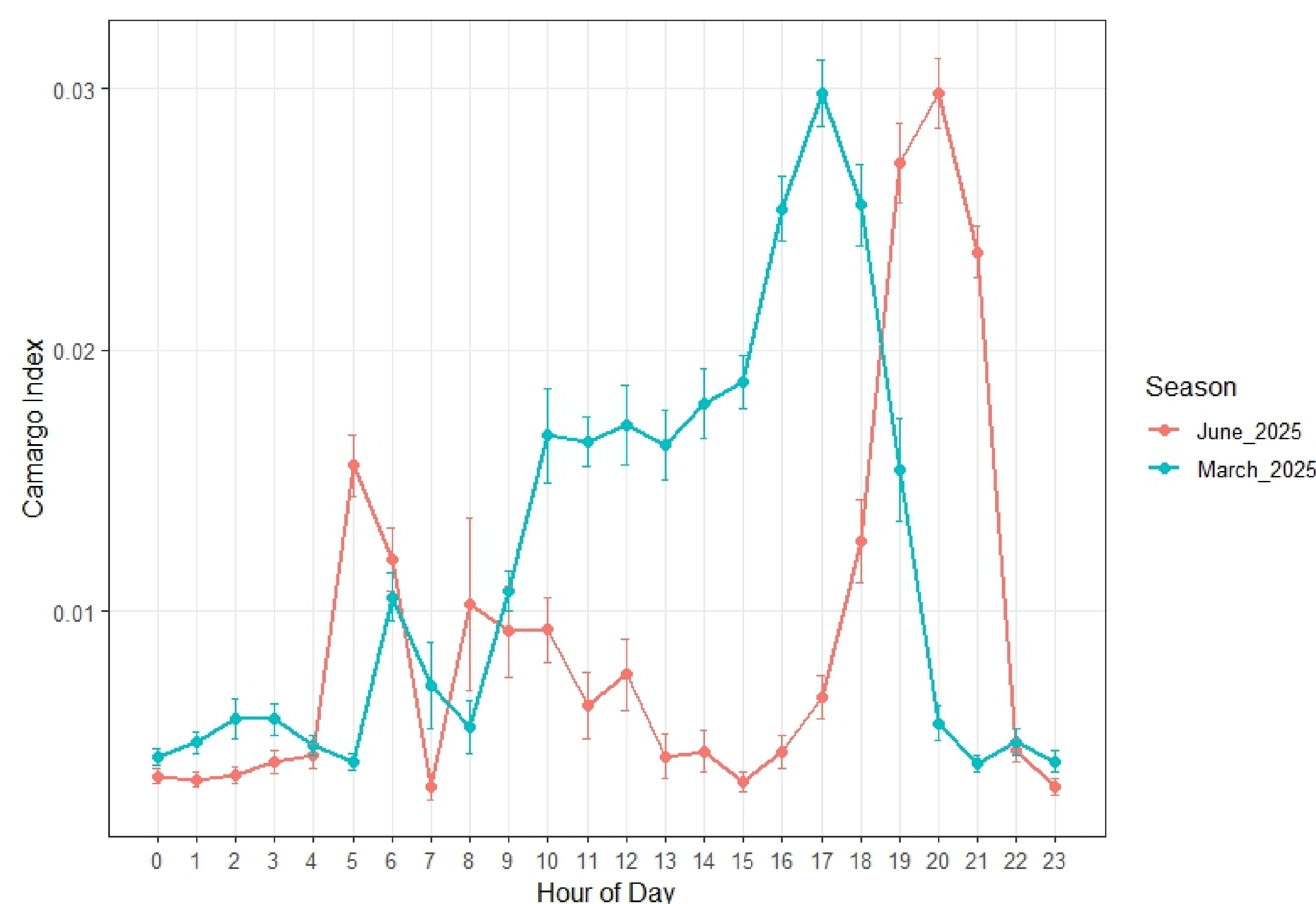
CI quantifies the uniformity of space use in grazing contexts (Pauler et al., 2022)

RESULTS

Season	daily UD95 (emmeans±SE)		P-value
	ha	% of the total grazing area	
March	1.34±0.05	63.5±2.6	0.16
June	1.20±0.08	56.8±3.9	



the areas of greatest use differed spatially



CI exhibited season-dependent diel patterns. In March, animals spread out more uniformly during the central hours of the day, whereas the opposite happened in June, indicating reduced movement and spatial aggregation, consistent with heat-avoidance strategies.

CONCLUSION



The combined use of UD95 and CI provides complementary information on pasture use patterns. Beyond describing animal behaviour, these indicators can support management decisions by identifying critical periods for shade provision, or strategies to mitigate heat stress.