

Ancient antlers, bones and historic literature add support to the huemul's historical presence in the Patagonian steppe

Jo Anne M. Smith-Flueck^{1,2,3} and Werner T Flueck^{2,3,4,5,6}

¹Theriogenology Laboratory of 'Dr Héctor H. Morello', Faculty of Agricultural Sciences, IBAC-CITAAC, Universidad Nacional del Comahue, Cinco Saltos, Argentina j.smith@deerlab.org

²DeerLab, Bariloche, Argentina

³Fundación Shoonem, Parque Protegido Shoonem, Alto Río Senguer, Argentina

⁴Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Buenos Aires, Argentina

⁵Swiss Tropical Institute of Public Health, University of Basel, Switzerland

⁶Parques Nacionales Argentina, Bariloche, Argentina

Abstract

Discoveries of ancient huemul (*Hippocamelus bisulcus*) remains in steppe areas of Patagonia and historical sightings provide additional evidence that this species once inhabited open environments beyond its present forested range in the Andean foothills and mountain terrain. In this short communication, we present four additional remains, plus four historic references, providing new evidence to complement previous archaeological and historical data (reviewed in Flueck et al. 2022,2023), reinforcing the view that the huemul's former distribution was broader and ecologically more diverse than currently observed. These findings not only enrich our understanding of the species' past ecology but also have important implications for interpreting its decline and guiding future conservation efforts.

Resumen

Los hallazgos de restos antiguos de huemul (*Hippocamelus bisulcus*) en las zonas esteparias de la Patagonia y los avistamientos históricos proporcionan pruebas adicionales de que esta especie habitó en su día en ambientes abiertos más allá de su actual área de distribución forestal en la cordillera y montañas de los Andes. En esta comunicación breve, presentamos cuatro restos adicionales, además de cuatro referencias históricas, que aportan nuevas pruebas para complementan los datos arqueológicos e históricos anteriores (revisados en Flueck et al. 2022, 2023), lo que refuerza la opinión de que la distribución anterior del huemul era más amplia y ecológicamente más diversa de lo que se observa actualmente. Estos hallazgos no solo

enriquecen nuestra comprensión de la ecología pasada de la especie, sino que también tienen importantes implicaciones para interpretar su declive y orientar los futuros esfuerzos de conservación.

Keywords: historical range, migration, plasticity, conservation ecology, antlers, zooarchaeology, distribution

Introduction

The huemul (*Hippocamelus bisulcus*) has long been mischaracterized as a strictly mountain-dwelling species (Flueck & Smith-Flueck 2011). However, recent reviews of explorer accounts, archaeological findings, and historical records reveal that this deer once occupied a much broader range across Patagonia, extending well into the steppe. Some populations were resident year-round in these open habitats, while others migrated seasonally between lowland and mountain environments (Flueck et al. 2022, 2023). Unregulated killing and the expansion of cattle and sheep ranching into the most fertile valleys led to the species' disappearance from much of its former range, leaving remnant populations isolated in remote mountain refuges (Flueck et al. 2022, Zuliani et al. 2023). These high-elevation areas, characterized by soils severely deficient in essential trace minerals, now pose additional health challenges to the few surviving huemul (Smith-Flueck et al. 2025). With only an estimated 300–500 individuals remaining in Argentina and no more than about 1,500 across the species' total range (Black-Decima et al. 2015), and numbers continuing to decline, a new conservation strategy is underway that includes reintroductions to former, more productive lowland habitats. Given continued skepticism regarding the huemul's historical presence in the Patagonian steppe, the goal of this study was to determine whether new findings of huemul carcasses further support earlier evidence of the species' former occupation of this region.

Material and Methods

The study area includes the Patagonian steppe of Argentina. We are continually updating our data base at DeerLab on newly discovered huemul antlers and remains and literature related to the historical distribution of this species. In this report, we include those finds not mentioned in our prior publications (Flueck et al. 2022, 2023), narrowed to those discoveries in steppe environments -- in places where huemul have not been sighted in modern times. For four new examples, we include the name of the collector,

coordinates of collection site and illustrative map of geography surrounding the discovery site, photo if available or description of antler or bone, and approximate collection date if available. Earth.google.com/web was used to generate maps that show general location of each collected antler for the corresponding latitude and longitude coordinates: the geographic coordinate system (GCS) was used and expressed in the degrees, minutes, seconds (DMS) format. We also include new data on huemul hunted in the steppe and other observations in historic literature, to provide further supporting evidence of their existence in the steppe.

Results

All four skeletal samples plus data on hunted huemul were from the province of Santa Cruz (Table 1, Fig. 1). Collection sites were all in the steppe habitat as seen by the Google Earth generated maps in Fig. 1. Only photos of sample number 2 were available for this publication (Fig. 2).

Table 1. Huemul remains collected and evidence of huemul hunted in the steppe environment of Patagonia, Argentina along with collection data.

SAMPLE NUMBER	SAMPLE DESCRIPTION	LOCATION COORDINATES	LOCATION DESCRIPTION	MAPPED LOCATION	COLLECTORS
1	Antler. We had direct communication with collector.	49° 9'19.50"S, 72° 2'50.00"W	Found close to Cerro Cach Aike, Santa Cruz	See Fig. 1a	Mario Diaz-ex-director Fauna Santa Cruz
2	2-pointed left antler (See Fig. 2)	51° 8'0.91"S, 72° 19'6.66"W	Santa Cruz	See Fig. 1b	Enrique Segundo Ibañez, Estancia El Cazador
3	An antler stored by Ana María and Lidia Hernando that father collected in 1938.	47° 12'49.62"S, 70°35'38.35"W	Santa Cruz	See Fig. 1c	Don Procopio Hernando from El Carmen, Santa Cruz
4	Front of cervid cranium from late Holocene.	47° 27'00" S, 68°50'00" W	Santa Cruz	See Fig. 1d	Miotto & Marchionini (2023)
5	Two huemul were hunted during expedition 1877-1880. Collected measurement data from one, a female.	48°10'10.33"S, 71 °3'23.23"W	Ay-Aiken, Rio Chico, Santa Cruz; 70 km from forest	See Fig. 1e	Ramon Lista (1880)

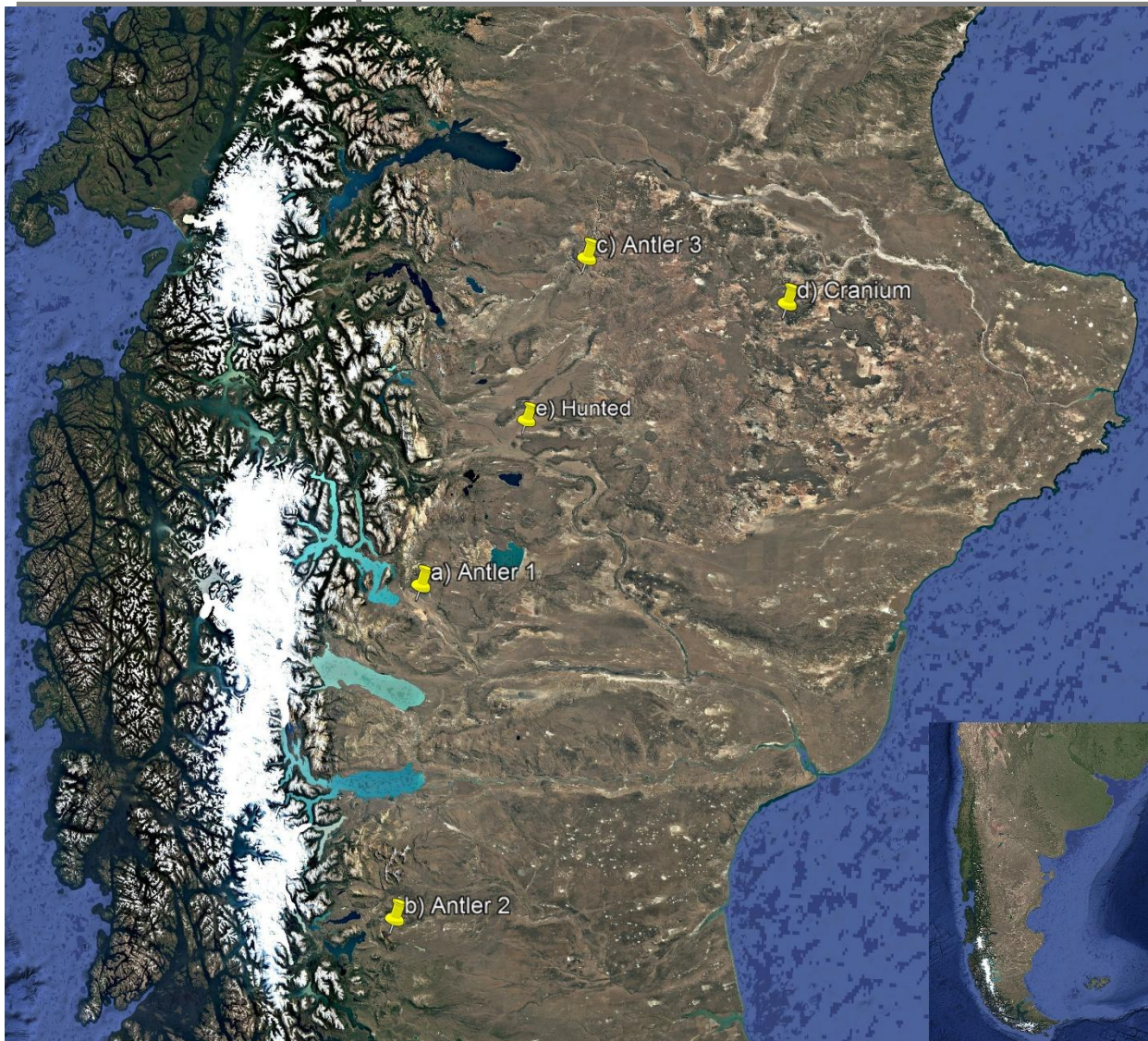


Figure 1. Sites in Santa Cruz province Argentina where three antlers (a-c) and one partial cranium (d) were found, and huemul were hunted (e), revealing a steppe landscape void of forests.



Figure 2. Front and back of a left antler, specimen number #2, collected by Enrique Segundo Ibañez at the Estancia El Cazador.

Furthermore, we located two additional historic publications that mention huemul in relation to the steppe, and one more in relation to migration patterns. Firstly, Minde (1839) wrote, “The *Equus bisulcus* Molina (Huemul or Guemul) is a fabulous animal, whose name nobody in Chile knows. The government probably is likely too weak to sustain their presence in their systems. The huemul likes large and plain grassland and steppe areas to move around in herds.” Secondly, Moreteau (1895) included a photo of a huemul in the open (Figure 3), location unidentified.



Figure 3. Photo of huemul and gaucho on horse in open habitat (Moreteau 1895).

Thirdly, Crivelli (1994) wrote that before the horse arrived, the indigenous Pehuenches, using bow and arrow, mainly hunted guanaco, huemul, greater rhea, and armadillos. The Pehuenches more to the south also went up in summer and back down in winter in pursuit of these same two ungulate prey species.

Discussion

The endangered Patagonian huemul may be the only cervid species in modern times confined year-round to what was once its historical summer range in the mountains. The loss of its former migratory behavior—driven by human activities that extirpated and displaced the species from the more fertile lowland valleys—has left remaining populations restricted to areas with poor soils. This confinement likely explains the severe trace mineral deficiencies and associated health problems observed in many of today’s huemul subpopulations (Flueck & Smith-Flueck 2017). A current initiative in Argentina, under the direction of the Directorate of Fauna and Flora of Chubut Province, aims to reintroduce the species to parts of its historical range to alleviate nutritional limitations, improve overall health, and promote population recovery. The

success of this effort will depend on close collaboration with local landowners surrounding the reintroduction sites and, in the reestablishment and conservation of historical migratory corridors to connect seasonal ranges.

Some have suggested that the remains found in steppe habitats may have been transported from the western Andean slopes and cordillera by Indigenous people (Díaz 2000). While this possibility cannot be entirely excluded, several lines of evidence argue against it for the antler samples. These samples (Antlers #1, 2, and 3) were not found in archaeological contexts such as middens or caves containing other animal remains, but rather buried in the soil after long exposure to natural processes. In the absence of associated huemul bones or other faunal material, the most plausible explanation is that they were shed naturally by males during the annual antler drop in mid to late winter (Smith-Flueck et al. 2025). This period coincides with both migratory and resident huemul occupying steppe habitats (Flueck et al. 2022), increasing the likelihood that shed antlers were occasionally deposited and preserved in the region's dry soils. The rarity of such finds is likely influenced by the extremely low human population density throughout the Patagonian steppe (1–2 persons per km²) and by the fact that most travel across these grasslands occurs on horseback, limiting ground-level visibility for locating such remains.

Conclusion

The additional evidence presented here strengthens the case that huemul once occupied steppe environments as part of their natural range, alongside migratory and resident populations. Recognizing this broader historical distribution is essential for guiding current recovery efforts, including planned reintroductions into more productive lowland habitats with connectivity to summer ranges, thus allowing potential to re-establish migratory behavior. Restoring access to such environments may not only help address the severe nutritional limitations observed in present mountain populations but also contribute to rebuilding a more resilient and self-sustaining huemul population across Patagonia.

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Ethical statement

None of these samples are in our collection, nor were government permits required for this research.

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