



ULST Timisoara
**Multidisciplinary Conference on
Sustainable Development**
30-31 May 2024



**COMPARATIVE MORPHOLOGICAL ASPECTS OF PELVIC LIMB BONES IN SOME
RUMINANT SPECIES**

**ROȘU P. M., GEORGESCU B., BELU C., MIHAI S.A., MUSTĂȚEA A.I., ȘERBĂNESCU D., DĂNACU V.,
TĂPĂLOAGĂ D.**

University of Agronomic Sciences and Veterinary Medicine of Bucharest, Faculty of Veterinary Medicine, 011464, 59
Mărăști Blvd, District 1, Bucharest, Romania

The study aims to describe the morphological characteristics of the long bones of the pelvic limb in species belonging to the Families *Camelidae* and *Ruminantia*. Families included in the Order *Artiodactyla* are herbivorous animals found in the territories of Latin America and Africa, respectively, in all continents in the case of domestic ruminants. The morphological differences of these bones can be used for clear species identification. The specialized literature provides brief and insufficient data regarding the morphological particularities of the pelvic limb bones among the four species of ruminants. Bones from several domestic ruminants, such as cattle and sheep, and bones from two wild captive specimens, a llama and a Bactrian camel, were used for the study. All the materials are from the anatomy discipline collection. The following conclusions emerge: the gluteal crest is more developed in domestic ruminants than in camelids, where it is significantly reduced; the llama presents, like sheep, at the level of the ischial tuberosity, a hook-like cranio-lateral cusp; the ischiatic spine, in camelids, ends with a pronounced crest that marks an elongated surface of muscular insertion; in camelids, the acetabular fossa is formed slightly eccentrically; also the camelid specimen had a ossified fibula.

Keywords: pelvic limb, ruminants, Bactrian camel, llama

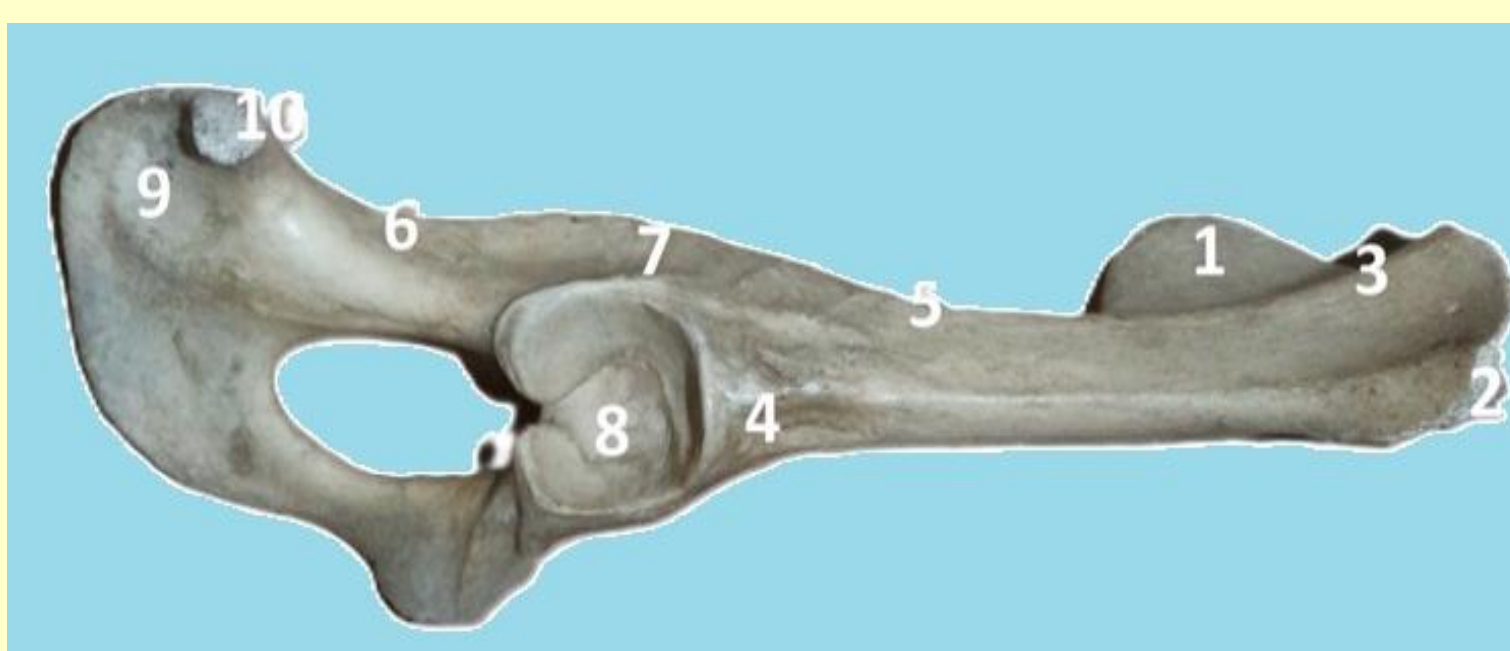
• **Introduction**

❖ Camelids and domestic ruminants are species belonging to the same order, *Artiodactyla*. However, their limb skeleton presents a series of morphological particularities that can be used in species identification. This study aims to describe the pelvic limb bones of the studied ruminants as completely as possible and highlight the particularities and differences between these species. The specialized literature contains abundant data on the morphological characteristics of the appendicular skeleton and muscles in domestic ruminants. In contrast, the anatomy of the appendicular skeleton in camelids includes a small number of data, especially details of their morphological characteristics.

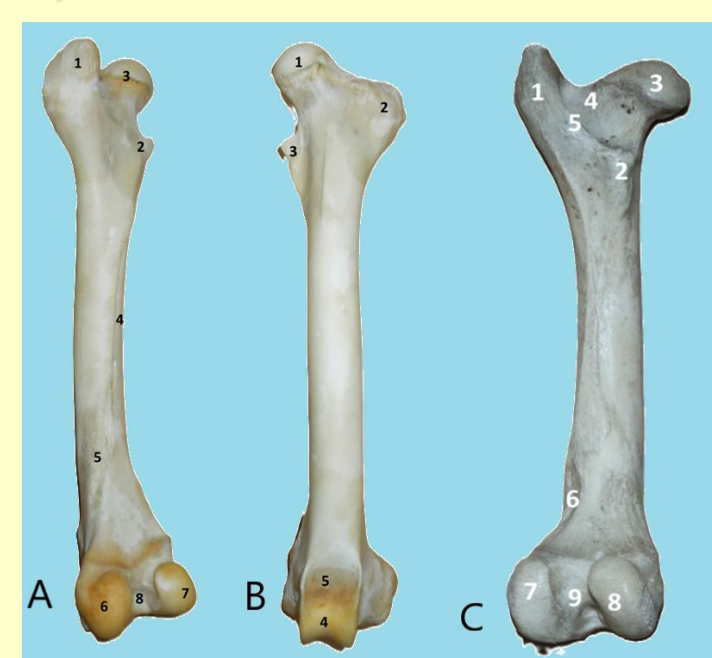
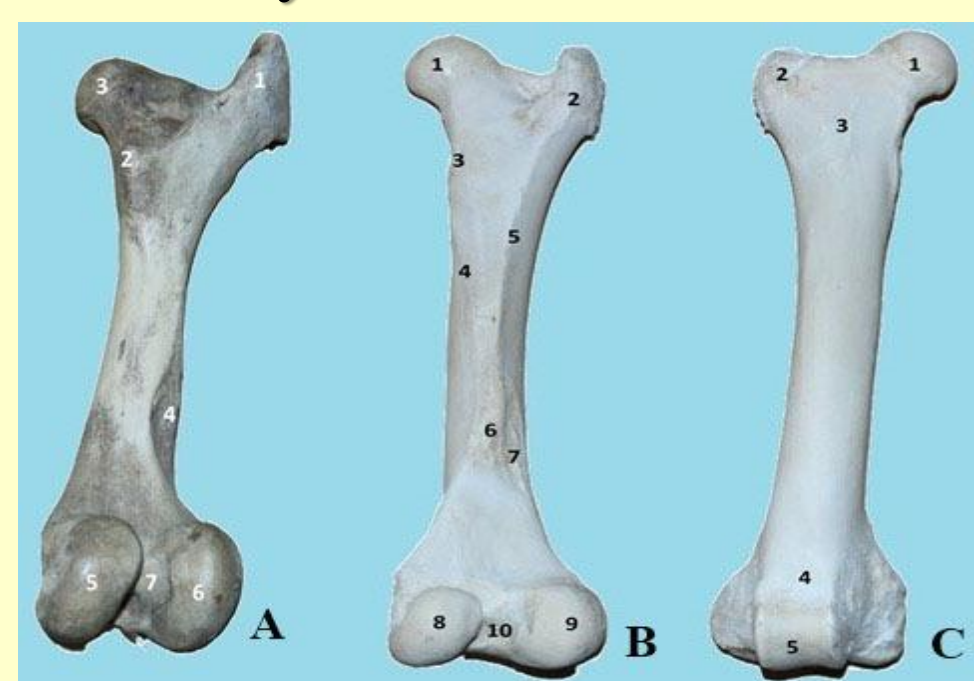
• **Material and method**

❖ To describe the morphology of the pelvic limb skeleton, bones from the following species were used: taurine, ovine, a specimen of llama (*Lama glama*), and a specimen of Bactrian camel (*Camelus bactrianus*). The materials belong to the collection of the Anatomy discipline at the Faculty of Veterinary Medicine in Bucharest. The bones were obtained after removing the soft tissues and then subjected to a controlled maceration process. They were then washed, degreased, dried and bleached by immersion in a 30% hydrogen peroxide solution (H_2O_2). The morphological characteristics of the appendicular skeleton were described, and the most exciting aspects were photographed in all four species. The description is in accordance with *Nomina Anatomica Veterinaria* (N.A.V.) 2017.

• **Results and discussions**



The taurine's coxal is massive, with a concave shaft. The coxal tubercle is evident with three eminences, and the sacral tubercle is smaller, simple and rough. In the Bactrian camel, the coxal axis is concave, the iliac wing has a relatively triangular appearance, and the body of the ilium is elongated and thick. The sacral tubercle is elongated, thick and rough, while the coxal tubercle is simple. The coxal bones in ovines are much thinner than in taurines, presenting a straight axis. The coxal tubercle is simple, rough and relatively rounded, while the sacral tubercle divides into two spines, one dorso-cranial and the other dorso-caudal. In the llama, the axis of the coxal is relatively concave. The iliac crest is convex, the coxal tubercle is simple, and the sacral one has spaced spines, structuring a dorso-cranial and a dorso-caudal iliac spine



In taurines, the femur has a massive cylindroid shaft. The femoral head is spheroidal, and its articular surface reaches the femoral neck. In the Bactrian camel, the femoral head is spherical and presents an eccentrically arranged ligament insertion notch, slightly caudo-ventrally. The articular surface covers only the femoral head. In ovines, the greater trochanter is undivided, rectangular in appearance and slightly exceeds the articular surface of the femoral head. In llama, the greater trochanter is undivided and does not exceed the articular surface of the femoral head.

• **Conclusions**

The coxal shows a prominent gluteal line in domestic ruminants, while it is significantly reduced in camelids. The ischial tuberosity is tricuspid in ovines and llamas, with a highly developed hook-like caudo-lateral cusp. In Taurines, the coxal tubercle has three eminences, while in the Bactrian camel, it is simple. Both the Bactrian camel and taurines have a ventral pubic tubercle. In camelids, the ischiatic spine ends with a pronounced crest that marks an elongated surface of muscular insertion. A reduced pubic groove is present on the cranial edge of the pubis. The *fovea capitis* is placed centrally in domestic ruminants and arranged slightly eccentrically in camelids. The lesser trochanter has a cone-like appearance in domestic ruminants and is elongated in camelids. The greater trochanter exceeds the surface of the femoral head only in domestic ruminants. In the Bactrian camel, on the caudal face of the femur, two rough lines descend from the base of the trochanters and join above the supracondylar fossa, forming an obvious tuberosity. In the llama, from the level of the lesser trochanter, an obliquely rough line descends on the caudal face of the body and reaches the level of the rough surface that replaces the supracondylar fossa. The suprapatellar fossa is deep in llamas. In the Bactrian camel, the two femoral condyles are arranged slightly obliquely. In the Bactrian camel, both the proximal extremity and the body of the fibula are present, and the two structures have a styloid appearance. The malleolar bone represents the distal extremity. The tibial cochlea is arranged slightly obliquely.