Online resource 1. Studied specimens

Paleobiology of *Argyrolagus* (Marsupialia, Argyrolagidae): an astonishing case of bipedalism among South American mammals.

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Argyrolagid specimens studied

Argryolagus scagliai

Type MMP 785-S

Procedence. 200 meters north of the Bajada de los Lobos, Chapadmalal Formation, bed 9; Buenos Aires Province, Argentina.

Description and comments. This specimen was originally composed of complete skull, left mandible, atlas, eleven caudal vertebrae, sacrum and pelvis, fragment of scapula, parts of both humeri and of one radius and one ulna, both femora, both tibiae and fibulae (fused), five tarsals, metatarsals of both sides, and three pedal phalanges (Simpson 1970: 25). Among the original components of MMMP 785-S (not noted by Simpson 1970 in the hypodigma but in the decription in page 30, and figured in figs. 15 and 16) were also a left astragalus, both calcanea, a navicular and a left cuboid. These latter were described by Szalay (1994: 215, figs 7.29 and

7.30). Unfortunately, the cuboid is currently lost. Currently, type specimen include: skull and left mandible, pelvis and sacro, eleven caudal vertebrae, fragment of left scapula; distal fragment of right humerus (Simpson 1970: fig. 9), proximal fragment of right and left radius, proximal fragment of left ulna, one complete left femur (lacking distal epiphysis), two proximal fragments of right femurs, one proximal fragment of left femur, five distal fragments of left femurs, two distal fragments of right femurs, left and right distal fragments of metatarsal III, proximal right metatarsals III and IV, proximal left metatarsal III, one roughly complete left tibio-fibula (lacking the more distal end; 785-Sa), proximal epiphysis of right and left tibia (785-Sb and 785-Sc respectively), two fragments of tibio-fibula shafts; two distal fragments of left tibio-fibula (785-Sd and 785-Se), one distal fragment of right tibio-fibula (785-Sf), right calcaneus and astragalus.

***Argyrolagus* sp.**

MLP 91-IV-1-85

Procedence. Quequén Salado River, locality of Cascada Grande (see Pardiñas et al. 2017), General Dorrego Department, Irene "Formation" late Early—early Late Pliocene; Buenos Aires Province, Argentina.

Description. Skull and left mandible (Pardiñas et al. 2017: fig. 10.6-7), complete right humerus and distal portion of left humerus, right and left ulnas, right and left radius, five metacarpals, three ungual, three proximal and one distal phalanges of the hand, fragmentary diaphysis of femur, left tibio-fíbula, fragmentary right diaphysis and left epiphysis of tibia-fibula, left calcaneus, proximal right metatarsal III, and distal fragment of metatarsal, one proximal phalange of foot, eight caudal vertebras.

Comments. MLP 91-IV-1-85 is assigned to *Argyrolagus* by the presence of several diagnostic features (Simpson 1970: 10): m1-4 strongly bilobed (*i.e*., with differentiated trigonid and talonid, see Goin and Abello, 2013) with opposite labial and lingual vertical grooves of approximately equal strength. Second lobe (*i.e*, talonid, see Goin and Abello, 2013) relatively longer than in *Microtragulus*, and m4 not so markedly unlike m3. Specific assignment of this specimen requires a more extensive comparative study which is beyond the objective of this paper.

MLP 87-XIII-II-1

Procedence. Barranca Parodi, Miramar locality, middle levels of Chapadmalal Formation; Buenos Aires Province, Argentina. Description: right and left mandibles with fragmentary incisives and complete p3-m4, proximal left radius, proximal right ulna, distal fragment of right femur and diaphysis of left femur, distal left tibio-fibula, complete left and fragmentary right calcaneus, two fragmentary phalanges.

Microtragulus reigi

Type MMP 691-S

Procedence. Foot of cliff 120 meters south of the Bajada de las Palomas, Chapadmalal Formation, probably bed 3 or 4; Buenos Aires Province, Argentina. Description and comments: this specimen includes, as originally, a cranium probably associated with a tibio-fibula (Simpson 1970: 25).

MMP 395-M

Procedence. Bed I in the cliff 550 meters northeast of Arroyo Las Brusquitas, Barranca de los Lobos Formation; Buenos Aires Province, Argentina. Description and comments: specimen 395-M cluster different elements respect than those enumerated by Simpson (1970: 10 and 25). The original specimen 395-M was a lot of bones, which included fragments of maxilla and mandible referable to *M. reigi*, plus limb bones and fragments of several (probably three) individuals, perhaps not all of this genus (Simpson 1970: 28): three complete humeri, three nearly complete femora, and a calcaneum; in addition, under this colletion number there were diverse fragments not assignable to this family. Currently, 395-M includes a right mandible with incisive and m1-2, left maxilla with M1, and fragmentary m2-3 referable to *M. reigi*; two right and one left complete humerus, one fragment of proximal humerus probably referable to *Argyrolagus* based on its size (see Fig. 1 of this MS); in addition, there is a petroso, five fragmentary pelvis, one sacro and vertebrae and several fragments, all no assignable to the Argyrolagidae.

Extant marsupial specimens used for comparison

Didelphidae

Didelphis aurita. MLP 11-VII-02-2

Monodelphis dimidiata. MLP 5-11-96-39

***Thylamys* sp**. MLP 24-X-01-3

Microbiotheriidae

Dromiciops gliroides. MACN 23607

Potoroidae

Potorous tridactylus. MLP 2-III-96-9

Thylacomyidae

Macrotis lagotis. MLP 2-III-96-8

Pseudocheiridae

Pseudocheirus peregrinus. MLP 2-III-96-1

Phalangeridae

Trichosurus vulpecula. MLP 2-III-96-2, MLP 2-III-96-3, MLP 2-III-96-4.

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