



A New Pleistocene bird assemblage from the Southern Pampas (Buenos Aires, Argentina)



Marcos M. Cenizo^{a,b,*}, Federico L. Agnolin^{c,b}, Lucas H. Pomi^d

^a Facultad de Ciencias Exactas y Naturales, Universidad Nacional de La Pampa, Uruguay 151, 6300 Santa Rosa, La Pampa, Argentina

^b Fundación de Historia Natural "Félix de Azara", Departamento de Ciencias Naturales y Antropología, CEBBAD, Universidad Maimónides, Hidalgo 775, C1405BDB Ciudad Autónoma de Buenos Aires, Argentina

^c Laboratorio de Anatomía Comparada y Evolución de los Vertebrados, Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Av. Angel Gallardo, 470, 1405 Buenos Aires, Argentina

^d Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata, Calle 122 y 60, 1900 La Plata, Argentina

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ABSTRACT

In the present paper we report the most complete fossil avifauna from the southern cone of South America. The specimens here described were collected in the Paso Otero locality, at the middle stream of the Quequén Grande River, Pampean Region (Buenos Aires Province, Argentina). The fossiliferous levels belong to the La Chumbiada Member of Luján Formation ($37,800 \pm 2300$ yr BP, late Pleistocene). The assemblage is represented by 60 specimens belonging to at least 22 taxa. The radiocarbon age indicates that Paso Otero birds represent the oldest late Pleistocene avifauna known from the South American continent and the first coming from a clear interstadial event (MIS3). Available evidence indicates similar environmental conditions during the MIS3 interstadial in the Pampean Region of Argentina and the post-Last Glacial Maximum stadials in southeastern Brazil. The absence of significant extinction events in the latest Pleistocene–early Holocene avifaunas of Brazil and Argentina suggests that the main avifaunal composition along southeastern continental lowlands may not be affected by the cyclic retraction and extension of open environments. On the contrary, the fossil record of Peru and Ecuador demonstrates that a large number of taxa, including aquatic and predatory-scavenger birds, have gone extinct along Andean environments at the Pacific coast, and late Pleistocene climatic oscillations may have played a more dramatic impact in these avian communities.

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1. Introduction

The fossil record of birds in the Pleistocene of South America, including the Pampean Region of Argentina, is rather patchy and biased, in clear contrast to its well known mammalian faunas (Tambussi, 1995). Most reports belong to isolated and rather fragmentary specimens, and only some scarce authors describe more than a single avian remain from each fossiliferous locality (Tonni and Laza, 1980; Tonni and Fidalgo, 1982; Deschamps, 2005). However, there are some sparse localities along the continent that yielded abundant late Pleistocene birds remains. Regrettably, these continental assemblages are rather distant each other and most of them located at intertropical South America (Winge, 1888; Campbell, 1976, 1979, 1982; Guérin et al., 1993, 1996). In this way, no single representative Pleistocene avifauna was reported up to now for the southern cone.

Here we report a rich late Pleistocene avian assemblage from the Pampean Region, at the Paso Otero locality, southern Buenos Aires Province, Argentina (Fig. 1A,B). Previous works in this locality

mentioned the presence of some fossil birds, including *Pterocnemia* cf. *P. pennata* (D'Orbigny, 1834), *Nothura darwini* Gray, 1867, *Chloephaga* sp., *Fulica leucoptera* Vieillot, 1817, and *Cyanoliseus* cf. *C. patagonus* (Vieillot, 1817) (Tonni and Laza, 1980), together with diverse mammalian remains (Prado et al., 1987). Recent work resulted in the recovery of the most abundant and diverse Pleistocene avifauna known from the Pampas and one of the richest vertebrate faunas from this interval in Argentina. Excavations yielded a large amount of avian remains, including 60 recognizable specimens representing at least 22 taxa. The aim of the present paper is to describe and analyze this assemblage, and to discuss its paleoenvironmental and paleobiogeographical implications.

2. Materials and methods

The fossil assemblage from Paso Otero locality (POP1) comprises 1432 skeletal elements corresponding to fishes, anurans, birds, and mammals (Pomi and Tonni, 2011). The excavations of POP1 took place from 2007 to 2009, and covered six grids of 1 m².

The systematic arrangement follows the proposals of Dickinson and Renssen (2013, and literature cited therein). Osteological terminology follows Baumel and Witmer (1993) and Livezey and Zusi (2006). Anatomical terminology of the quadrate bone is based on Elzanowski et al.

* Corresponding author at: Facultad de Ciencias Exactas y Naturales, Universidad Nacional de La Pampa, Uruguay 151, 6300 Santa Rosa, La Pampa, Argentina.

E-mail address: cenizomarcos@yahoo.com.ar (M.M. Cenizo).



Fig. 1. Geographic location of fossiliferous localities mentioned in the text. A, Late Pleistocene–early Holocene South American avian assemblages: 1. Talara (Piura Department, Peru); 2. La Carolina (Santa Elena Province, Ecuador); 3. Toca da Janela da Barra do Antonião Cave (Piauí State, Brazil); 4. Minas Gerais caves (Minas Gerais State, Brazil); 5. Paso Otero (Buenos Aires Province, Argentina). B, Location detail of Paso Otero fossiliferous locality.

(2000). Comparisons were based on osteological specimens of extant species listed in [Appendix 1](#). The cross in the text (†) indicates extinct taxa.

Bone measurements correspond to personal analyses and data sets published by previous authors: Tinamidae (Cenizo et al., 2012), Anatidae (Campbell, 1979; Louchart et al., 2005), Podicipedidae (Storer, 1976; Bocheński, 1994; Olson, 1995), Phoenicopteridae (Rich and Walker, 1983), Threskiornithidae (Miller and Bowman, 1956; Campbell, 1979), Scolopacidae (Emslie, 2004), Cathartidae (Howard, 1974; Campbell, 1979; Carr, 1981; Becker, 1986; Stucchi and Emslie, 2005; Alvarenga et al., 2008), Accipitridae (Campbell, 1979), Falconidae (Campbell, 1979; Emslie, 1998; Olson, 2008), and Furnariidae (Noriega, 1991).

Measurements (in mm) were taken with a digital vernier caliper to the nearest 0.01 mm and are expressed as follows: max–min, mean (n).

2.1. Measurement abbreviations

D-cm, width of os metacarpale major; D-dist, depth of distal end; D-prox, depth of proximal end; L-ac, length from facies articularis sternalis to processus acrocoracoideus; L-lo, length from condylus lateralis to capitulum oticum; L-pc, length from facies articularis sternalis to

processus procoracoideus; TL, total length; W-II, width of trochlea metatarsi II; W-III, width of trochlea metatarsi III; W-IV, width of trochlea metatarsi IV; W-dist, width of distal end; W-fo, width of facies articularis sternalis; W-la: width between the dorsal margin of cotyla lateralis and the ventral margin of articular bone; W-qm, width between the cotyla quadratojugalis and the condylus medialis; W-prox, width of proximal end; W-shaft, width of shaft.

2.2. Institutional abbreviations

MACN, Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina; MLP, Museo de La Plata, La Plata, Argentina.

3. Geographic and geologic setting

POP1 is located at the mid-stream of Quequén Grande River, in southern Buenos Aires Province, Argentina (38°11'48"S, 59°06'56" W; Fig. 1A,B). The Quequén Grande River scurry at the Bonaean Intermontane Area, from the Tandil Hill System to Atlantic Ocean. This system, together with the Ventania Hills System, interrupts an extensive geographic region of plains dominated by grasslands (commonly called "Pampas"). The present-day climate of this area is temperate, with an

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