C. R. Palevol 16 (2017) 746–761

Contents lists available at ScienceDirect

Comptes Rendus Palevol

www.sciencedirect.com

General Palaeontology, Systematics and Evolution (Vertebrate Palaeontology)

A new Ruscinian site in Europe: Baza-1 (Baza basin, Andalusia, Spain)

Un nouveau gisement ruscinien en Europe : Baza-1 (bassin de Baza, Andalousie, Espagne)

Sergio Ros-Montoya[a], Bienvenido Martínez-Navarro[b,c,d,*], María-Patrocinio Espigares[a], Antonio Guerra-Merchán[a], José Manuel García-Aguilar[a], Pedro Piñero[c], Ainoa Rodríguez-Rueda[c], Jordi Agustí[b,c,d], Oriol Oms[e], Paul Palmqvist[a]

[a] *Departamento de Ecología y Geología, Facultad de Ciencias, Campus Universitario de Teatinos, 29071 Málaga, Spain*
[b] *Institut Català de Paleoecologia Humana i Evolució Social-IPHES, Campus Sescelades, 43007 Tarragona, Spain*
[c] *Àrea de Prehistoria, Universitat Rovira i Virgili (URV), Tarragona, Spain*
[d] *ICREA, Pg. Lluís Companys 23, 08010 Barcelona, Spain*
[e] *Departament de Geologia, Facultat de Ciències, Universitat Autònoma de Barcelona, 08193 Bellaterra, Barcelona, Spain*

ARTICLE INFO

Article history:
Received 30 November 2016
Accepted after revision 3 May 2017
Available online 21 June 2017

Handled by Lars vanden Hoek Ostende

Keywords:
Guadix–Baza depression
Pliocene
Mammut borsoni
Anancus arvernensis

ABSTRACT

The Guadix–Baza depression (southeastern Spain) preserves one of the best continental Plio-Pleistocene records of the European continent. The new site, Baza-1, is the first Ruscinian locality with fauna of large vertebrates known in the basin. During the summer seasons of 2001, 2002, 2015 and 2016, systematic excavations were undertaken in the site over an area of 25 m^2, which provided > 400 fossil remains of Ruscinian mammals. The faunal assemblage is diverse, comprising 17 genera. Rodentia are represented by *Ruscinomys* sp., *Apocricetus barrierei*, *Debruijnimys julii*, *Apodemus gorafensis*, *Castillomys gracilis*, *Occitanomys* cf. *brailloni*, *Paraethomys meini*, *Paraethomys* aff. *abaigari*, *Stephanomys cordii*, *Trilophomys* cf. *castroi* and *Eliomys* aff. *intermedius*. Large mammals are represented by two proboscideans, *Anancus arvernensis* and *Mammut borsoni*, the rhino *Stephanorhinus* sp. cf. *S. jeanvireti*, the equid cf. *Hipparion* sp., two bovids, a large sized *Alephis* sp. and a small-to-middle sized Bovidae indet. (cf. *Antilope* sp.), and a middle sized deer, Cervinae indet. This record is completed by the presence of a chelonid, Testudinae indet. Biostratigraphic data from micro and macromammals suggest an age for the assemblage between 4 and 4.5 Ma.

Mots clés :
Dépression de Cadix–Baza
Pliocène
Mammut borsoni
Anancus arvernensis

RÉSUMÉ

La dépression de Cadix–Baza (Sud-Est de l'Espagne) préserve l'un des meilleurs registres continentaux du Plio-Pléistocène pour le continent Européen. Le nouveau gisement de Baza-1 est la première localité ruscinienne à faune de grands vertébrés, reconnue dans ce bassin. Durant les étés de 2001, 2002, 2015 et 2016, des fouilles systématiques ont été

* Corresponding author at: IPHES, Campus Sescelades (Edifici W3) URV, 43007 Tarragona, Spain.
E-mail address: bienvenido.martinez@icrea.cat (B. Martínez-Navarro).

http://dx.doi.org/10.1016/j.crpv.2017.05.005
1631-0683/

menées dans le site de Baza-1 sur une surface de 25 m^2, et ont fourni plus de 400 restes fossiles de mammifères d'âge ruscinien. L'association faunique est diversifiée, comprenant 17 genres. Les rongeurs sont représentés par *Ruscinomys* sp., *Apocricetus barrierei*, *Debruijnimys julii*, *Apodemus gorafensis*, *Castillomys gracilis*, *Occitanomys* cf. *brailloni*, *Paraethomys meini*, *Paraethomys* aff. *abaigari*, *Stephanomys cordii*, *Trilophomys* cf. *castroi* et *Eliomys* aff. *intermedius*. Les grands mammifères sont représentés par deux proboscidiens, *Anancus arvernensis* et *Mammut borsoni*, le rhinocéros *Stephanorhinus* sp. cf. *S. jeanvireti*, l'équidé cf. *Hipparion* sp., deux bovidés, un de grande taille, *Alephis* sp., et un de taille petite à moyenne Bovidae indet. (cf. *Antilope* sp.), et un cervidé de taille moyenne, Cervinae indet. Ce registre est complété par la présence d'un chélonien, Testudinae indet. Les données biostratigraphiques des micro- et macromammifères suggèrent un âge compris entre 4 et 4,5 Ma pour cet assemblage.

1. Introduction

The early Pliocene continental site of Baza-1 is located in the Guadix–Baza depression (Betic Cordillera, Andalusia, SE Spain) near the town of Baza, in the ravine of "Seguidillas–Cuesta del Francés", which is placed in an area locally known as "Las Arrodeas" (Fig. 1). The site was discovered in 1996 by one of the authors of this paper (BMN). Up to this year, five paleontological field studies have been carried out at the site, including a geological and paleontological survey in 1999, two small excavations of 3×3 m during the years 2000 and 2001, and two systematic excavations in 2015 and 2016. By the moment, ~ 25 m^2 have been excavated and ~ 400 vertebrate fossil remains have been unearthed.

The continental sedimentary record of the Baza basin shows six sedimentary units of lacustrine origin deposited from the latest Miocene to the middle Pleistocene (García-Aguilar and Martín, 2000; García-Aguilar and Palmqvist, 2011). Depending on the interval considered, these deposits are mainly composed of marls, carbonates or gypsiferous evaporites, showing lithological, mineralogical and geochemical features that evidence intense, tectonically induced hydrothermal activity. The supply of hot waters was particularly intense during the early Pleistocene, as indicated by the high concentrations of strontium and sulphur as well as the abundance of travertines and magnesium clays. This evidences the presence of warm conditions throughout the year and a high level of organic productivity, which allowed the development of a rich and well diversified mammalian community in the Baza basin (García-Aguilar et al., 2014, 2015).

The Guadix–Baza depression preserves the most complete mammalian record of the circum-Mediterranean area, ranging in age from the latest Miocene until the latest middle Pleistocene. The best-studied deposits correspond to the middle and late Villafranchian. These are especially well represented in the Orce area, with sites such as Venta Micena, which has a chronology of ~ 1.6 Ma and has provided a record of > 17,000 fossils of large mammals unearthed from a surface of ~ 370 m^2. However, it should be noted that this site has a potential of more than a million of fossiliferous square meters to be excavated (Espigares, 2010; Martínez-Navarro, 1991). In addition, there are a couple of sites in the vicinity of Orce, Barranco León and Fuente Nueva 3, which are both somewhat younger (~ 1.4 Ma) than Venta Micena and preserve the oldest evidence of human presence in western Europe, including huge tool assemblages of Oldowan tradition, abundant cut marks on large mammal bones and a human deciduous tooth in the case of Barranco León (see reviews in Espigares et al., 2013; Toro-Moyano et al., 2013). In spite of its exceptional Pleistocene record, no Ruscinian locality with large mammals was known in the Baza basin until the discovery of Baza-1. This situation is normal in Europe, where early Pliocene large mammals sites in the time interval comprised between 5.3 and 3.4 Ma (Ruscinian) are rather scarce.

The best known localities are Çalta (in the Asian part of Turkey, close to Ankara), with an age close to 4 Ma (MN15) (Sen et al., 1998), Megalo Emvolon in Greece (Arambourg and Piveteau, 1929; Koufos and Kostopoulos, 1997), Malusteni (MN15a), Capeni and Varghis (MN15b) in Romania (Radulescu et al., 2003), Ivanovce and Hajnacka I (MN16a) in Slovakia (Fejfar et al., 2012), several localities in the area of Roussillon in France, Val de Pugna in Tuscany, Italy with a chronology of MN15-MN16 (Bianucci et al., 2001), several sites with MN14 and MN15 chronologies in Russia (Pevzner et al., 1996), Dorkovo in Bulgaria with an age close to 4.5 Ma (Metz-Muller, 2000; Radulescu and Crégut-Bonnoure, 1997; Spassov, 2005; Thomas et al., 1986) and Vialette in the French Massif, with a younger chronology (3.2 Ma) and a very interesting faunal association (Lacombat et al., 2008).

In the Iberian Peninsula, Ruscinian deposits are present in Alcoy, Alicante (MN14) (Montoya et al., 2006), La Calera, in the Calatayud–Teruel basin, and Layna, in Soria (Alberdi and Alcalá, 1989–1990; Alcalá et al., 1989–1990; Azanza and Menéndez, 1989–1990). Another interesting Pliocene site in Spain is Camp dels Ninots, in the maar of Caldes de Malavella (Girona), with a chronology of ~ 3.2 Ma (early Villafranchian), in which skeletal remains in anatomical connection of several individuals from different species have been recovered (Campeny Vall-Llosera and Gómez, 2010; Gómez De Soler et al., 2012).

Other deposits close to Baza-1 with a similar age include Barranco de las Quebradas and Huéscar 3, both in Huéscar (Martínez-Navarro et al., 2006; Mazo et al., 1985), and Zújar (Agustí and Oms, 1998), although the large mammal record recovered from these sites is less abundant than in Baza-1.