

Catalogue of Spanish Plio-Pleistocene amphibians and squamate reptiles from the Museu de Geologia de Barcelona

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RESUMEN

BLAIN, H.-A. y BAILON, S. Catálogo de los anfibios y escamosos plio-pleistocenos de España del Museu de Geologia de Barcelona.

El presente catálogo representa el primer intento de hacer la lista del material herpetofaunístico del Plio-Pleistoceno depositado en el Museu de Geologia de Barcelona y procedente de 14 yacimientos españoles (8 de Cataluña, 3 de Castellón, 2 de Granada y 1 de Murcia). Esto permite completar el conocimiento de la presencia de taxones “exóticos” como las víboras orientales, el género *Pseudopus* y los Agamidae en la península ibérica durante el Plioceno superior. Muchas de éstas corresponden a las últimas citaciones. Por otra parte, la ocurrencia en los yacimientos catalanes de especies de origen medio-Europeo durante el Pleistoceno inferior permite documentar algunas de las más viejas referencias de su presencia en España.

Palabras llave: Catálogo, Anfibios, Escamosos, Paleobiogeografía.

ABSTRACT

BLAIN, H.-A. and BAILON, S. Catalogue of Spanish Plio-Pleistocene amphibians and squamate reptiles from the Museu de Geologia de Barcelona.

The present catalogue represents the first attempt to list the Plio-Pleistocene herpetofaunal material deposited in the Museu de Geologia de Barcelona and providing from 14 Spanish localities (8 from Catalonia, 3 from Castellón, 2 from Granada and 1 from Murcia). It permits to complete the knowledge of the presence of some “exotic” taxons as Oriental Vipers, genus *Pseudopus* and Agamidae in Iberian Peninsula during the Late Pliocene. Many of these citations may correspond to the ultimate ones. Moreover, the presence in Catalan localities of species of middle-European origin during the Early Pleistocene documents ones of the oldest references to their presence in Spain.

Key words: Catalogue, Amphibia, Squamata, Palaeobiogeography.

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INTRODUCTION

The fossil remains of amphibians and squamate reptiles often compose an important part of microvertebrate bones found in Spanish Pliocene and Pleistocene localities. Their study may contribute to a better knowledge of the history of the different species as contrasting data of the molecular biology and, to a certain extent, to the biochronology and to the reconstruction of the environment or climate of the different periods of the Quaternary.

The remains presented in this paper all provide from the collections of the Museu de Geologia de Barcelona. Part of this material has been described and drawn within framework of a Ph.D. Thesis (Blain, 2005): here we only draw up a list.

CATALOGUED SITES

CATALUNYA

Begur 1, Girona

Localization: Quarry of Puig Broca, close to the road from Begur to Regencós, at 1 km of this city.

Age: Middle Pleistocene (Mindel?; López *et al.*, 1976).

The fossils appear in some fissure fillings in the quarry situated at the North of the road, property of Servià Cantó, S.A. The locality was discovered in 1974 by C.S. Martí and destroyed the same year by the quarry exploitation.



Figure 1. Geographical location in the Iberian Peninsula of the palaeontological and archaeological localities listed in this work.

Figura 1. Situación geográfica en la Península ibérica de los yacimientos paleontológicos y arqueológicos listados en este trabajo.

- v7322.
Pelobates cf. *cultripes* (Cuvier, 1829), 1 vertebra.
Bufo cf. *bufo* (Linnaeus, 1758), 2 vertebrae.
 cf. *Vipera* (European species), 1 cervical vertebra and 1 trunk vertebra.

Begur 2, Girona

Localization: Quarry of Puig Broca, close to the road from Begur to Regencós, at 1 km of this city.

Age: Early Pleistocene (MmQ2; Laplana, 1999).

Begur 2 has been discovered, in the beginning of the year 1975 by J.V. Castells, collaborator at the Departament de Geomorfologia of the Universitat de Barcelona, in the same quarries which provide the locality of Begur 1. This site is a fissure filling with a large quantity of small vertebrate remains.

- v7352.
Lacertidae indet., 1 fragment of maxillar and 1 fragment of dentary.
Anguis fragilis Linnaeus, 1758, 1 fragment of trunk vertebra.
Coronella girondica (Daudin, 1803), 4 trunk vertebrae.
Rhinechis scalaris (Schinz, 1822), 5 trunk vertebrae.
Malpolon monspessulanus (Hermann, 1804), 8 trunk vertebrae and 2 trunk vertebrae.
 “Colubrinae” indet., 2 trunk vertebrae.
Natrix maura (Linnaeus, 1758), 4 trunk vertebrae.
Natrix natrix (Linnaeus, 1758), 15 trunk vertebrae.
Natrix sp., 7 trunk vertebrae.
Vipera cf. *aspis* (Linnaeus, 1758), 8 cervical vertebrae and 19 trunk vertebrae.
Serpentes indet., 2 cervical vertebrae, 27 fragments of trunk vertebrae and 9 caudal vertebrae.
- v7410.
Pelobates cf. *cultripes* (Cuvier, 1829), 1 vertebra.
Pelodytes cf. *punctatus* (Daudin, 1802), 1 left humerus of female.
Bufo bufo (Linnaeus, 1758), 1 left humerus of female, 3 humeri of male (2 left and 1 right), 3 vertebrae and 1 tibio-fibula.
Bufo calamita (Laurenti, 1768), 3 humeri of female (1 left and 2 right).
Bufo sp., 1 vertebra.
- Without reference.
Pelobates cf. *cultripes* (Cuvier, 1829), 1 atlas.
Pelodytes cf. *punctatus* (Daudin, 1802), 1 right humerus of female.
Bufo cf. *bufo* (Linnaeus, 1758), 1 vertebra.
Bufo sp., 9 vertebrae and 1 fragment of radio-ulna.
 “Colubrinae” indet., 1 trunk vertebra.
Natrix maura (Linnaeus, 1758), 1 trunk vertebra.
Natrix sp., 1 cervical vertebra and 8 trunk vertebrae.
Serpentes indet., 1 fragment of trunk vertebra.

Begur 3, Girona

Localization: Quarry of Puig Broca, close to the road from Begur to Regencós, at 1 km of this city.

Age: Quaternary.

Third fissure filling discovered in 1976 in the same quarries which provide the localities of Begur 1 and Begur 2.

- v7323.
cf. *Natrix*, 1 cervical vertebra and 1 trunk vertebra.

Cala Montgó, L'Escala, Girona

Without data on location.

Age: Quaternary.

- v7423.
Pelodytes cf. *punctatus* (Daudin, 1802), 1 right humerus of male and 1 left humerus of female.
Bufo cf. *bufo* (Linnaeus, 1758), 1 left humerus of female.
Lacertidae indet., 1 maxilla.
cf. *Coronella*, 2 fragments of trunk vertebrae.
“Colubrinae” indet., 5 trunk vertebrae.
Vipera cf. *aspis* (Linnaeus, 1758), 6 cervical vertebrae and 20 trunk vertebrae.
Serpentes indet., 11 trunk vertebrae and 3 caudal vertebrae.

Cova Bonica, Massif of Garraf, Gavà, Barcelona

Localization: This cave is situated at the base of the cliffs at the South of Can Vall de Joan, in the place named “Sot de l’Infern” (Borràs, 1974). Latitude, 41° 17’ 32”. Longitude, 1° 56’ 28.50”. Altitude, 320 m. above sea level.

Age: Late Pliocene (MN16; Crusafont Pairó & Golpe Posse, 1984; Delson, 1971).

- v9372.
Pseudopus cf. *pannonicus* Kormos, 1911, 4 trunk vertebrae.
- v9373.
Blanus cinereus (Vandelli, 1797), 1 trunk vertebra.
Agamidae indet., 1 caudal vertebra.
Pseudopus sp., 8 caudal vertebrae.
Natrix cf. *maura* (Linnaeus, 1758), 1 trunk vertebra.
- v9374.
Blanus cinereus (Vandelli, 1797), 14 trunk vertebrae.
Agamidae indet., 2 trunk vertebrae.
Serpentes indet., 1 caudal vertebra.

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- v9375.
Agamidae indet., 2 caudal vertebrae.
 - v9376.
Pseudopus sp., 2 left dentaries.
 - v9377.
Agamidae indet., 3 maxillae and 7 dentaries (1 left, 1 right and 5 fragments).
 - v9378.
Agamidae indet., 1 fragment of maxilla and 2 right dentaries.
 - v9379.
Pseudopus sp., 1 fragment of maxilla and 1 left dentary.
 - v9380.
Pseudopus cf. *pannonicus* Kormos, 1911, 1 right maxilla.
 - v9381.
Pseudopus cf. *pannonicus* Kormos, 1911, 1 fragment of parietal and 160 osteoderms.
 - v9382.
Blanus cinereus (Vandelli, 1797), 1 trunk vertebra.
Agamidae indet., 2 trunk vertebrae.
Coronella girondica (Daudin, 1803), 2 trunk vertebrae.
Rhinechis scalaris (Schinz, 1822), 11 trunk vertebrae and 12 fragments of trunk vertebrae.
Malpolon monspessulanus (Hermann, 1804), 5 trunk vertebrae and 4 fragments of trunk vertebrae.
“Colubrinae” indet., 5 fragments of trunk vertebrae and 8 fragments of trunk vertebrae.
Natrix natrix (Linnaeus, 1758), 1 cervical vertebra and 7 trunk vertebrae.
Vipera sp. (Oriental species), 1 trunk vertebra.
Serpentes indet., 2 cervical vertebrae and 3 caudal vertebrae.
 - v9396.
Bufo bufo (Linnaeus, 1758), 1 left humerus of female and 1 vertebra (2nd).
Blanus cinereus (Vandelli, 1797), 3 trunk vertebrae.
Agamidae indet., 1 trunk vertebra.
Pseudopus sp., 3 caudal vertebrae.
“Colubrinae” indet. 5 trunk vertebrae.
Serpentes indet., 1 cervical vertebra and 1 caudal vertebra.
 - v9406.
Blanus cinereus (Vandelli, 1797), 1 right dentary.
Agamidae indet., 10 fragments of maxillae and 4 fragments of dentaries.
cf. *Tarentola mauritanica* (Linnaeus, 1758), 2 fragments of left dentaries.
Lacertidae indet., 9 dentaries (4 left and 5 right).
Pseudopus sp., 2 fragments of right maxillae.
Serpentes indet., 1 fragment of dentary.

Cova d'Olopte (Cova B), Isòvol, Cerdanya

Localization: The cave is open in the direction of the city of Olopte at the South–West and situated along the river Duran, at 50 m from the cave named Cova Gran and 35 m above the river bed level (Borràs *et al.*, 1978; Monzonis, 1975). Latitude, 42° 23' 20". Longitude, 5° 29' 58". Altitude, 1.145 m.

Age: Middle Pleistocene, Middle Bronze Age and part and final of the Iron Age (Hallstatt). According to Villalta (1974) the age of the material associate to *Marmota marmota* and *Citellus major* is Würm II.

The fossils of the Museu de Geologia have been recovered from the 18 to 23 April 1973 by the Equip de Recerques Espeleològiques of the Centre Excursionista de Catalunya, in relation with the Sección de Ecología del Cuaternario of the “Instituto Almera”, managed by J.F. de Villalta. In addition to the Museum catalog number, we note the excavation square.

- 30942 (B-10).
cf. *Pelodytes*, 1 vertebra.
cf. *Rana*, 1 vertebra.
- 30943 (B-3).
Bufo cf. *calamita* (Laurenti, 1768), 1 sacral vertebra, 1 radio-ulna and 1 phalanx.
Rana temporaria Linnaeus, 1758, 1 ilium and 1 fragment of humerus.
- 30951 (B-14).
Pelodytes cf. *punctatus* (Daudin, 1802), 1 vertebra.
- 30957 (A-6).
Lacertidae indet., 1 femur.
- 30980 (B-13).
cf. *Bufo*, 1 fragment of radio-ulna.
- 30981 (A-7).
cf. *Rana*, 1 fragment of humerus and 1 phalanx.
- 30982 (B-12).
Serpentes indet., 2 caudal vertebrae.
- 31004 (B-11).
Rana sp., 1 sacral vertebra and 1 fragment of right humerus.
- 31005 (B-9).
Natrix maura (Linnaeus, 1758), 1 trunk vertebra.
- 31006 (A-10).
Anura indet., 1 fragment of vertebra.
Lacerta sp., 1 fragment of premaxillar.
Lacertidae indet., 1 right maxillar.
- 31017 (A-9).
Serpentes indet., 1 fragment of trunk vertebra.
- 31022 (B-12).
Serpentes indet., 1 fragment of trunk vertebra.

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- 31041 (A-12).
cf. *Bufo*, 1 urostyle.
Lacertidae indet., 1 hemi-pelvis.
Serpentes indet., 1 fragment of trunk vertebra and 1 caudal vertebra.
 - 31081 (B-7).
Vipera sp. (European species), 1 trunk vertebra.
 - 31082 (A-7).
Malpolon monspessulanus (Hermann, 1804), 1 trunk vertebra.
Serpentes indet., 1 fragment of trunk vertebra.
 - 31083 (B-13).
Lacerta sp., 2 dentaries (1 left and 1 right).
 - 31084 (A-6).
Lacertidae indet., 1 premaxilla and 1 trunk vertebra.
Serpentes indet., 1 fragment of cervical vertebra and 1 trunk vertebra.
 - 31085 (B-4).
Lacertidae indet., 1 fragment of maxilla.
Natrix maura (Linnaeus, 1758), 1 trunk vertebra.
 - 31087 (Z-B, Bossa-A).
Coronella cf. *girondica* (Daudin, 1803), 1 trunk vertebra.
 - 31088 (B-12).
cf. *Rana*, 1 right premaxilla.
 - 31092 (B-12).
Rana sp., 2 fragments of maxillae, 1 vertebra (8th).
Lacerta sp., 1 fragment of premaxilla, 4 maxillae (2 right and 2 fragments) and 1 vertebra.
Coronella girondica (Daudin, 1803), 2 trunk vertebrae.
Vipera sp. (European species), 3 trunk vertebrae.
Serpentes indet., 1 left pterygoid, 2 cervical vertebrae, 7 fragments of trunk vertebrae and 6 caudal vertebrae.
 - 31093 (A-12).
Lacertidae indet., 1 left maxilla, 1 right dentary, 1 trunk vertebra and 1 caudal vertebra.
Vipera cf. *aspis* (Linnaeus, 1758), 24 trunk vertebrae.
 - 31094 (B-3).
Lacerta sp., 1 trunk vertebra.
Natrix maura (Linnaeus, 1758), 2 cervical vertebrae and 2 trunk vertebrae.
 - 31095 (B-3).
Lacertidae indet., 1 trunk vertebra.
Anguis fragilis Linnaeus, 1758, 2 trunk vertebrae.
Serpentes indet., 1 caudal vertebra.
 - 31098 (B-10).
Serpentes indet., 1 caudal vertebra.

Cova del Gegant, Massif of Garraf, Sitges, Barcelona

Localization: The cave is situated in the tip named Punta de les Coves, between the beaches of Rosés and Les Coves (Vilanova de la Geltrú, Sitges). It is the largest one of the place in size and the second one in depth (Ferrer, 1966).

Age: Late Pleistocene, Mousterian.

The material has been recovered during the excavation made in 1974 and 1975, at the instances of the Sección de Ecología del Cuaternario of the Instituto “Jaime Almera”, by a team managed by Ramón Viñas, in which have participate members of the Equip de Recerques Espeleològiques of the Centre Excursionista de Catalunya and of the A.R.S. of Barberà del Vallès (Viñas & Villalta, 1975).

- v913 (C-1 0-30).
Pelobates cultripipes (Cuvier, 1829), 1 distal fragment of ilium.
- v2599 (C-2 10-20).
Bufo sp., 1 coracoid.
Vipera sp. (European species), 1 trunk vertebra.
- v2670 (C-2 10-20).
cf. *Rana*, 1 radio-ulna.
- v2671 (C-2 30-40).
Vipera sp. (European species), 1 trunk vertebra.
- v2672 (C-2 50-60).
Serpentes indet., 1 caudal vertebra.
- v2681 (C-2 10-20).
Malpolon monspessulanus (Hermann, 1804), 1 trunk vertebra.
- v2718 (C-1 50-60).
Malpolon monspessulanus (Hermann, 1804), 1 trunk vertebra.
cf. *Rhinechis scalaris* (Schinz, 1822), 2 fragments of trunk vertebrae.
- v2726 (C-1 0-60).
cf. *Malpolon monspessulanus* (Hermann, 1804), 1 cervical vertebra and 1 fragment of trunk vertebra.
- v2735 (C-2 20-30).
Anura indet., 1 vertebra.
“Colubrinae” indet., 1 trunk vertebra.
- v2742 (C-1 0-60).
Rhinechis scalaris (Schinz, 1822), 1 trunk vertebra.
- v2749 (C-2 10-20).
Bufo sp., 1 radio-ulna.
- v2764 (C-2 10-20).
Bufo sp., 1 vertebra.

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- v2781 (C-2 20-30).
Lacerta cf. lepida Daudin, 1802, 1 trunk vertebra.
Malpolon monspessulanus (Hermann, 1804), 1 trunk vertebra.
 - v2789 (Capa 1-2).
cf. Rhinechis scalaris (Schinz, 1822), 1 fragment of trunk vertebra.
 - v2803 (C-2 20-40).
Pelobates cultripes (Cuvier, 1829), 1 fragment of left maxilla.
Malpolon monspessulanus (Hermann, 1804), 1 trunk vertebra.
cf. Rhinechis scalaris (Schinz, 1822), 1 fragment of trunk vertebra.
 - v2878 (C-1 0-30).
Bufo bufo (Linnaeus, 1758), 1 sacral vertebra.
Bufo cf. calamita (Laurenti, 1768), 1 right ilium.
cf. Lacerta lepida Daudin, 1802, 1 trunk vertebra.
Rhinechis scalaris (Schinz, 1822), 4 trunk vertebrae.
 - v2882.
Bufo cf. calamita (Laurenti, 1768), 1 right ilium and 1 left female humerus.
 - v2912 (C-1 0-30).
Pelobates sp., 1 vertebra.
Bufo calamita (Laurenti, 1768), 1 left scapula, 1 radio-ulna and 1 tibio-fibula.
cf. Rhinechis scalaris (Schinz, 1822), 1 fragment of trunk vertebra.
 - v2914.
Malpolon monspessulanus (Hermann, 1804), 1 trunk vertebra.
 - v2918 (C-1 0-30).
cf. Malpolon monspessulanus (Hermann, 1804), 1 fragment of trunk vertebra.
 - v2919 (C-1 0-30).
Bufo calamita (Laurenti, 1768), 1 left scapula and 1 fragment of left ilium.
Rana sp., 1 tibio-fibula.
 - v2928 (C-1 0-30).
Bufo calamita (Laurenti, 1768), 1 left ilium and 1 fragment of vertebra.
 - v3016 (G 109-110).
Malpolon monspessulanus (Hermann, 1804), 1 trunk vertebra.
Rhinechis scalaris (Schinz, 1822), 2 trunk vertebrae.
 - v3087 (C-4 0-30).
Rhinechis scalaris (Schinz, 1822), 1 cervical vertebra and 1 trunk vertebra.
“Colubrinae”, 1 trunk vertebra.
 - v3098 (C-4 0-30).
Malpolon monspessulanus (Hermann, 1804), 1 trunk vertebra.
 - v3122 (C-4 0-30).
Bufo sp., 1 radio-ulna.

- v3123 (C-4 0-30).
Serpentes indet., 1 fragment of trunk vertebra.
- v3206 (C-1 60cm).
Bufo bufo (Linnaeus, 1758), 2 left humerus of female.
- v3219 (C-1 60-65).
Bufo sp., 1 sacral vertebra and 1 fragment of tibio-fibula.
- v3222 (C-1 60-65).
Bufo cf. *bufo* (Linnaeus, 1758), 1 sacral vertebra
Serpentes indet., 1 fragment of trunk vertebra.
- v3252 (C-2 60-70).
Serpentes indet., 1 caudal vertebra.
- v3256 (C-1 0-30).
Bufo sp., 1 fragment of radio-ulna.
- v3266 (C-2 5-10).
Bufo sp., 1 fragment of vertebra.
- v3296 (C-5 50-60).
Bufo calamita (Laurenti, 1768), 1 left ilium.
- v3297 (C-2 10-20).
Bufo sp., 1 squamosal and 1 anterior vertebra.
- v3303 (C-5 0-20).
Bufo sp., 2 vertebrae.
- v3304 (C-5 40-60).
Serpentes indet., 2 fragments of trunk vertebrae.
- v3310 (C-5 20-40).
Bufo sp., 1 vertebra.
- v3316 (C-4 0-30).
Pelobates cultripipes (Cuvier, 1829), 1 sacral vertebra.
Bufo sp., 1 radio-ulna and 1 tibio-fibula.
Serpentes indet., 1 fragment of trunk vertebra.

Cova dels Musclos, Massif of Garraf, Sitges, Barcelona

Localization: In the tip named Punta de les Coves, between the beaches of Rosés and Les Coves, at 30 m of the Cova del Gegant. It can be distinguished by its large entrance, visible from the sea, from 13 m high and 5 m wide (Ferrer, 1966).

Age: Late Pleistocene, Mousterian.

- v1704.
cf. *Pelodytes*, 1 tarsus.
Serpentes indet., 2 fragments of cervical vertebrae and 3 fragments of trunk vertebrae.

- v1734.
Rhinechis scalaris (Schinz, 1822), 1 trunk vertebra.
- v1855.
Lacertidae indet., 1 right maxilla, 1 left dentary and 2 trunk vertebrae.
Serpentes indet., 2 fragments of trunk vertebrae and 1 caudal vertebra.
- v1857.
Lacertidae indet., 1 left dentary.
“Colubrinae” indet., 1 trunk vertebra.
cf. *Vipera aspis* (Linnaeus, 1758), 1 cervical vertebra.
- v1858.
Pelobates cultripes (Cuvier, 1829), 1 frontoparietal fragment.
Pelodytes cf. *punctatus* (Daudin, 1802), 2 humerus of female (1 left and 1 right).
cf. *Rana*, 1 vertebra.
Lacerta cf. *lepida* Daudin, 1802, 1 fragment of trunk vertebra.
Lacertidae indet., 1 right dentary.
Coronella girondica (Daudin, 1803), 1 trunk vertebra.
Serpentes indet., 1 cervical vertebra and 4 fragments of trunk vertebrae.
- Without reference.
Lacerta cf. *lepida* Daudin, 1802, 1 trunk vertebra.
cf. *Rhinechis scalaris* (Schinz, 1822), 1 fragment of trunk vertebra.

CASTELLÓN

Casablanca 1, Almenara, Castellón

Localization: The localities of Casablanca 1, 3 and 4 are part of a large karstic complex cut by quarries exploitation in a little massif of Triassic limestones near the seashore at the South of the province of Castellón. Latitude, 39° 51' 0". Longitude, 0° 9' 0".

Age: Late Pliocene (MN17; Agustí & Galobart, 1986; Gusi, 2004; Furio-Bruno *et al.*, 2005).

The karstic fillings of Casablanca were discovered by a team of the Servei d'Investigacions Arqueològiques Provincials (SIAP) of the province of Castellón, managed by his director F. Gusi, in September of 1982. Casablanca-1 was first excavated by F. Gusi and E. Carbonell in 1983, and then during the years 1985 and 1986 by the SIAP and the Institut de Paleontologia M. Crusafont de Sabadell.

- v8354.
Blanus cinereus (Vandelli, 1797), 8 trunk vertebrae.
cf. *Tarentola mauritanica* (Linnaeus, 1758), 2 left dentaries.
Lacerta cf. *lepida* Daudin, 1802, 2 maxillae and 2 dentaries (1 left and 1 right).
Lacertidae indet., 4 maxillae.
Serpentes indet., 1 dentary and 1 caudal vertebra.

- v8369.
Blanus cinereus (Vandelli, 1797), 1 trunk vertebra.
 Geckonidae indet., 1 trunk vertebra.
Rhinechis scalaris (Schinz, 1822), 1 trunk vertebra.
Malpolon monspessulanus (Hermann, 1804), 1 trunk vertebra.
Vipera latasti Boscá, 1878, 1 cervical vertebra.
- v8370.
Bufo sp., 1 radio-ulna.
Lacerta lepida Daudin, 1802, 1 premaxilla and 1 trunk vertebra.
Rhinechis scalaris (Schinz, 1822), 2 trunk vertebrae.
Malpolon monspessulanus (Hermann, 1804), 7 trunk vertebrae.
 Serpentes indet., 2 cervical vertebrae.
- v8398.
Blanus cinereus (Vandelli, 1797), 3 trunk vertebrae.
 Agamidae indet., 4 trunk vertebrae, 1 caudal vertebra.
Lacerta sp., 3 trunk vertebrae.
 Lacertidae indet., 13 trunk vertebrae.
Coronella girondica (Daudin, 1803), 5 trunk vertebrae.
Rhinechis scalaris (Schinz, 1822), 1 trunk vertebra.
Malpolon monspessulanus (Hermann, 1804), 5 trunk vertebrae.
 “Colubrinae” indet., 5 trunk vertebrae.
Vipera latasti Boscá, 1878, 3 cervical vertebrae and 1 trunk vertebra.
 Serpentes indet., 4 cervical vertebrae, 6 fragments of trunk vertebrae and 5 caudal vertebrae.
- v8404.
 cf. *Rana*, 1 fragment of maxilla.
Blanus cinereus (Vandelli, 1797), 1 left dentary.
 cf. *Tarentola mauritanica* (Linnaeus, 1758), 8 dentaries (3 left and 5 right).
 Lacertidae indet., 3 premaxillae, 8 maxillae and 146 dentaries (26 left, 22 right and 98 fragments).
- v8406.
Blanus cinereus (Vandelli, 1797), 338 trunk vertebrae.
 Lacertidae indet., 11 trunk vertebrae. “Colubrinae” indet., 6 trunk vertebrae.

Casablanca 3, Almenara, Castellón

Latitude, 39° 51' 0". Longitude, 0° 9' 0".

Age: Early Pleistocene (MmQ3; Agustí & Galobart, 1986; Gusi, 2004; Furio-Bruno *et al.*, 2005).

This filling, as well as Casablanca-4, has been sampled and excavated by the SIAP and the Institut de Paleontologia “Miquel Crusafont” de Sabadell, during the years 1984, 1985 and 1986.

- v8439.
Bufo sp., 1 vertebra.
 Lacertidae indet., 6 fragments of dentaries and 1 trunk vertebra.

Coronella gironica (Daudin, 1803), 3 trunk vertebrae.
Rhinechis scalaris (Schinz, 1822), 1 trunk vertebra.
 Serpentes indet., 1 cervical vertebra and 1 caudal vertebra.

- v8440.
Bufo bufo (Linnaeus, 1758), 1 tibio-fibula.

Casablanca 4, Almenara, Castellón

Latitude, 39° 51' 0". Longitude, 0° 9' 0".
 Age: Late Pliocene (MN16-MN17; Gusi, 2004; Furío-Bruno, 2004).

- v8453.
Lacerta sp., 1 trunk vertebra.
 Lacertidae indet., 1 maxilla, 1 left dentary and 3 trunk vertebrae.
 Serpentes indet., 1 trunk vertebra and 2 caudal vertebrae.

GRANADA

Cueva del Agua, Iznalloz, Granada

Localization: Cueva del Agua is situated in the Pico del Asno of the Sierra Harana. Latitude, 37° 46' 0". Longitude, 3° 1' 0". Altitude, 1750 m.

Age: Middle to Late Pleistocene. It is one of the largest cave of the province of Granada, with a difference in height of 180 m. and a total length of 3000 metres.

- v8573.
Blanus cinereus (Vandelli, 1797), 3 trunk vertebrae.
 Lacertidae indet., 27 trunk vertebrae and 2 sacral vertebrae.
 cf. *Malpolon monspessulanus* (Hermann, 1804), 1 trunk vertebra.
Vipera cf. *latasti* Boscá, 1878, 1 cervical vertebra and 3 trunk vertebrae.
 Serpentes indet., 1 fragment of vertebra and 1 caudal vertebra.
- v8574.
Lacerta sp., 1 trunk vertebra and 2 hemi-pelvis.
- v8575.
Lacerta sp., 1 right dentary.
 Lacertidae indet., 1 maxilla and 14 dentaries (7 left, 4 right and 3 indet.).

Cúllar Baza-1, Cúllar Baza, Granada

Latitude, 37° 34' 60". Longitude, 2° 34' 0".
 Age: Middle Pleistocene (MmQ4; Ruiz-Bustos, 1976).

- v8599.
 Lacertidae indet., 2 fragments of maxillae and 1 left dentary.
 cf. *Natrix*, 4 trunk vertebrae.
Rhinechis scalaris (Schinz, 1822), 1 trunk vertebra.

MURCIA

Cueva Victoria, La Unión, Murcia

Localization: Cueva Victoria is a karstic filling situated in the eastern side of the Massif of San Ginés de la Jara, a calcareous massif near a little interior sea the Mar Menor and the easternmost spurs of the Sierra Minera.

Age: Early Pleistocene (MmQ3; Agustí, 1982).

- v6138.
Blanus cinereus (Vandelli, 1797), 1 left dentary and 1 trunk vertebra.
- v6139.
Coronella girondica (Daudin, 1803), 4 trunk vertebrae.
Rhinechis scalaris (Schinz, 1822), 6 trunk vertebrae.
Malpolon monspessulanus (Hermann, 1804), 2 trunk vertebrae.
- v6140.
Rhinechis scalaris (Schinz, 1822), 1 cervical vertebra, 6 trunk vertebrae and 1 fragment of trunk vertebra.
Malpolon monspessulanus (Hermann, 1804), 1 trunk vertebra.
Serpentes indet., 1 fragment of maxilla.
- v6141.
Lacerta cf. *lepida* Daudin, 1802, 1 premaxilla.
Lacertidae indet., 2 left maxillae, 1 right dentary and 1 fragment of dentary.
- v6142.
Coronella girondica (Daudin, 1803), 2 trunk vertebrae.
Malpolon monspessulanus (Hermann, 1804), 5 trunk vertebrae and 2 fragments of vertebrae.
- v6143.
Tarentola mauritanica (Linnaeus, 1758), 5 maxillae (3 right, 2 fragments), 4 dentaries (1 left, 3 right) and 1 trunk vertebra.
- v6144.
Lacerta cf. *lepida* Daudin, 1802, 2 premaxillae.
- v6145.
Gekkonidae indet., 1 right dentary.
- v6146.
Lacertidae indet., 1 maxilla.
- v6148.
Lacertidae (genus *Podarcis* / *Psammodromus*), 11 maxillae (4 left, 3 right and 4 fragments) and 28 dentaries (7 left, 11 right and 10 fragments).
Lacertilia indet., 6 fragments of maxillae, 12 dentaries (6 left, 5 right, 1 fragment) and 3 dental bones indet.
- v6171.
Serpentes indet., 1 fragment of maxilla.

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- v6172.
Blanus cinereus (Vandelli, 1797), 1 right dentary and 1 trunk vertebra.
 - v6173.
Chalcides sp., 2 dentaries (1 left, 1 right).
 - v6175.
Serpentes indet., 8 cervical vertebrae, 8 trunk vertebrae and 24 caudal vertebrae.
Malpolon monspessulanus (Hermann, 1804), 2 trunk vertebrae.
 - v6177.
Lacertidae indet., 1 trunk vertebra, 2 sacral vertebrae and 1 hemi-pelvis.
 - v6178.
Chalcides cf. *bedriagai* (Boscá, 1880), 6 maxillae (1 left, 1 right and 4 fragments) and 17 dentaries (7 left, 10 right).
 - v6179.
Lacertilia indet., 1 fragment of dental bone (probably a maxilla).
 - v6180.
Coronella girondica (Daudin, 1803), 1 trunk vertebra.
Malpolon monspessulanus (Hermann, 1804), 21 trunk vertebrae.
“Colubrinae” indet., 8 trunk vertebrae.
Serpentes indet., 1 fragment of maxilla and 2 cervical vertebrae.
 - v6181.
Coronella girondica (Daudin, 1803), 2 trunk vertebrae.
 - v6182.
Coronella girondica (Daudin, 1803), 1 trunk vertebra.
Rhinechis scalaris (Schinz, 1822), 3 trunk vertebrae and 4 fragments of vertebrae.
Malpolon monspessulanus (Hermann, 1804), 4 trunk vertebrae.
 - v6183.
Serpentes indet., 1 quadrate, 1 rib, 1 cervical vertebra, 1 caudal vertebra.
 - v6184.
Natrix maura (Linnaeus, 1758), 1 trunk vertebra.
 - v6185.
Rhinechis scalaris (Schinz, 1822), 1 trunk vertebra.
Malpolon monspessulanus (Hermann, 1804), 2 trunk vertebrae.
 - v6186.
Tarentola sp., 7 dentaries (5 left, 2 right).
 - v6393.
cf. *Pelodytes*, 2 radio-ulnae.
 - v6394.
cf. *Bufo*, 2 vertebrae.
 - v6395.
Bufo bufo (Linnaeus, 1758), 1 tibio-fibula.

DISCUSSION

From a palaeobiochronological point of view, during the Middle and Late Pliocene, many groups of thermophilic squamate reptiles will progressively disappear from Western Europe, due to the successive climatic peiorations between 2.4 and 1.8 million years: the Varanidae (*Varanus*; Bailon, 1989, 1991, 1992; Sanz, 1977), the Aniliidae s.l. (*Michauxophis*; Bailon, 1988, 1989 and 1991) and the Elapidae (*Naja*; Hoffstetter, 1939; Jaen & Sanchiz, 1985; Szyndlar, 1988; Bailon, 1989, 1991, 1992) at the end of the MN15, then the Scolecophidia (Bailon, 1991), *Eryx* (Boidae; Hoffstetter & Rage, 1972; Bailon, 1989, 1991 and 1992) and the Oriental Vipers (Viperidae; Bailon, 1989 and 1991; Blain, 2005) at the end of the MN16 and finally, the Agamidae (Bailon, 1987, 1989 and 1991; Bailon & Blain, 2003; Furio-Bruno *et al.*, 2005; Blain, 2005) at the end of the MN17. Only the genus *Dopasia* (formerly *Ophisaurus* s.l.) will persist till the end of the Early Pleistocene (MmQ3) in the South of Spain in Barranco León and Fuente Nueva 3 (Guadix-Baza; Bailon & Blain, 2005; Blain, 2005).

Among the material of the Museu de Geologia de Barcelona listed here, the locality of Cova Bonica (Barcelona, MN16) so represents the ultimate citation in the Iberian Peninsula for the genus *Pseudopus* and the Oriental Vipers and Almenara-Casablanca-1 (Castellón, end of the MN17) for the Agamidae.

Catalonia, with its geographical position on a penetration route of the middle-European species into the Iberian Peninsula (Llorente *et al.*, 1995 and Llorente & Montori, 2002), permits to document two distinct phenomena: 1) the presence of Mediterranean taxons north of their modern distribution during warmest periods and, vice versa, 2) the presence of middle-European taxons south of their modern distribution during coolest periods.

In this way, during the Late Pliocene, the Mediterranean worm lizard (*Blanus cinereus*) and the Bedriaga's skink (*Chalcides bedriagai*) show slightly northern distribution in comparison with present. They occur in the Massif of Garraf sites (Vallirana and Cova Bonica; Bailon & Blain, 2005; Blain, 2005) and in Callela-Y (Blain, 2005); *B. cinereus* was previously cited by Bailon (1991) in Medas Islands (MN16, Girona) and in Seynes (MN16, Gard, France).

First occurrence of middle-European species into the Iberian Peninsula are reported at the end of the Early Pleistocene (MmQ3), even if they were already present in the Late Pliocene of Montoussé 5 (Hautes-Pyrénées, France; Bailon, 1991). So the common brown frog (*Rana temporaria*) is present till the end of the MmQ3 in Cal Guardiola (Terrassa, Barcelona; Blain, 2005) and constitutes, jointly to the TD5 level of Gran Dolina (Atapuerca, Burgos; Blain, 2005), the only southern citations out of its modern distribution area in Spain. On the other hand, the presence of the asp viper (*Vipera aspis*) in Begur 2 and in the TD5 level of Gran Dolina constitutes its oldest citations in the Iberian Peninsula.

	Casablanca 4	Cova Bonica	Casablanca 1	Cueva Victoria	Begur 2	Casablanca 3	Begur 1	Cúllar-Baza-1	Cova del Gegant	Cova dels Musclos	Cova "B" d'Olopte	Cala Montgo	Begur 3	Cueva del Agua	TOTAL
Anura															
<i>Pelobates cultripipes</i>					2		1		4	1					8
<i>Pelodytes</i> cf. <i>punctatus</i>					2					3	2	2			9
cf. <i>Pelodytes</i>				2											2
<i>Bufo bufo</i>		2		3	9		2		4			1			21
<i>Bufo calamita</i>					3				11		3				17
<i>Bufo</i> sp.			1		11	1			15		2				30
<i>Rana temporaria</i>											2				2
<i>Rana</i> sp.									2		9				11
cf. <i>Rana</i>			1							1					2
Anura indet.									1		1				2
Amphisbaenia															
<i>Blanus cinereus</i>		6	351	4										3	364
Lacertilia															
Agamidae indet.		35	5												40
<i>Tarentola mauritanica</i>				18											18
cf. <i>Tarentola mauritanica</i>		2	11												13
<i>Chalcides</i> cf. <i>bedriagai</i>				25											25
<i>Lacerta</i> cf. <i>lepidota</i>			9	3					2	2					16
<i>Lacerta</i> sp.	1										10			4	15
Lacertidae indet.	5	9	185	48		7		3		6	11	1		44	319
<i>Pseudopus</i> cf. <i>pannonicus</i>		173													173
<i>Anguis fragilis</i>					1						2				3
Lacertilia indet.				20											20
Serpentes															
<i>Natrix maura</i>		1		1	5						6				13
<i>Natrix natrix</i>		8			15										23
<i>Natrix</i> sp.					16			4					2		22
<i>Coronella girondica</i>		2	5	10	4	3				1	3				28
cf. <i>Coronella</i>												2			2
<i>Rhinechis scalaris</i>		23	4	22	5	1		1	14	2					72
<i>Malpolon monspessulanus</i>		9	13	39	10				10		1			1	83
"Colubrinae" indet.		18	11	8	3				2	1		5			48
<i>Vipera</i> cf. <i>aspis</i>					27					1	24	26			78
<i>Vipera latasti</i>			5											4	9
<i>Vipera</i> sp. (European species)							2		2		4				8
<i>Vipera</i> sp. (Oriental species)		1													1
Serpentes indet.	3	9	17	49	39	2			6	13	26	14		2	180
TOTAL	9	298	618	252	152	14	5	8	73	31	106	51	2	58	1677

Table 1. Plio-Pleistocene herpetofaunal material from the Museu de Geologia de Barcelona collections.
 Tabla 1. Material herpetofaunístico plio-pleistoceno de las colecciones del Museu de Geologia de Barcelona.

ACKNOWLEDGEMENTS

We want to thanks Julio Gómez-Alba, curator of the Museu de Geologia de Barcelona for permitting us the study of the material in his care and for useful comments on the presentation of the manuscript. Professor Henry de Lumley (Institut de Paléontologie Humaine, Paris) and Professor Jordi Agustí i Ballester (Institut de Paleoecologia Humana, Tarragona) have support this work. The authors are indebted to the Doctor Àngel Galobart (Institut de Paleontologia Miquel Crusafont de Sabadell) and Miquel Nebot (Federació Catalana d'Espeleologia) for providing data on the location of some localities. This paper is part of the project CGL2006 - 4548/BTE of the Spanish Ministry of Education and Science.

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